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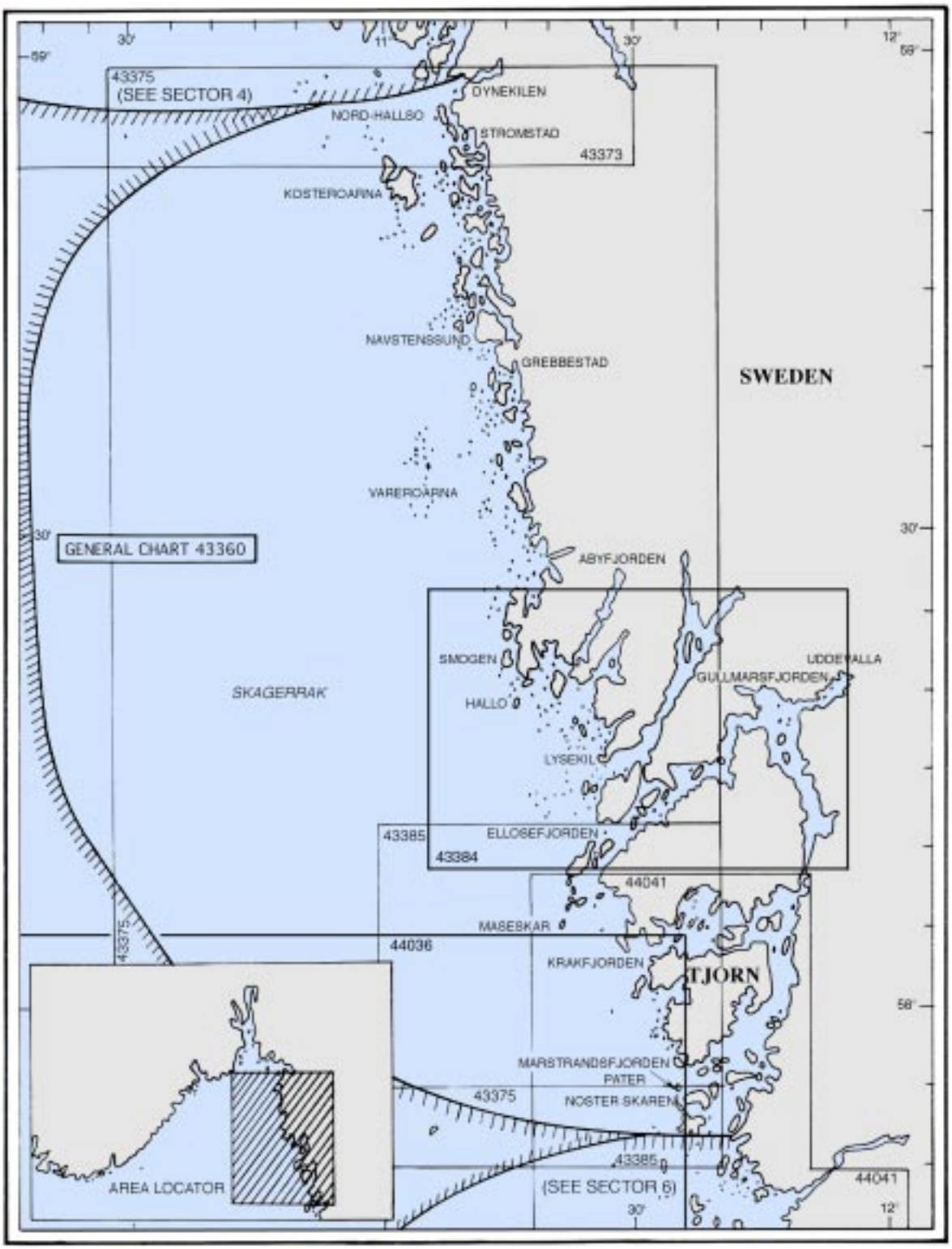

Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **5** — CHART INFORMATION

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SECTOR 5

SWEDEN—WEST COAST—SEKKEN TO MARSTRANDSFJORDEN

Plan.—This sector describes the NW coast of Sweden from a point near the boundary of the coastal waters between Norway and Sweden to Marstrandsfjorden about 65 miles SSE. The sequence is S from Sekken which includes the offshore islands and dangers and the waters of the fjords to Uddevalla.

General Remarks

5.1 The W coast of Sweden covered by this sector is fronted by "Skargard," a belt of islands and rocks extending from 4 to 8 miles seaward and rendering navigation intricate.

Although the coastline is very irregular, the fjords do not extend far inland and the scenery compared to that of Norway is less interesting. The dangers off this coast have sometimes been exaggerated as there are many places of refuge, some of them are fairly easy of access, and there are many navigational aids. Navigation within the islets and dangers of the Skargard is however intricate in difficult circumstances, strangers are advised to engage pilots who are familiar with the local area.

For further information on mined danger areas, see Pub. 140, Sailing Directions (Planning Guide) for the North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

On the mainland, smooth but rocky elevations are separated by long, narrow valleys bordered by high, rough slopes. The valleys, composed of clay floors, produce a great deal of cultivation. These valleys are usually submerged at their seaward ends, forming fjords.

As the out-lying dangers are steep-to, sounding is of little assistance when approaching this coast in thick weather.

Swedish Regulations

Displaying of National Flag in Swedish Territorial Waters.—Merchant vessels in Swedish territorial waters (see annual No. 1, Notice to Mariners for territorial claims), when in the company of Swedish warships in daylight, or when within 1 mile of restricted or semi-restricted areas, are required to hoist vessels' national flag. When at anchor in the company of Swedish warships the national flag shall be hauled down.

Entry to Restricted and Semi-restricted Areas.—Special regulations are in force with regard to the presence of aliens and foreign vessels within certain restricted and semi-restricted areas. These regulations are published in several languages including in English.

Vessels passing through a restricted or semi-restricted area may not deviate from the main channel, and stop only at such places as may be authorized by the Governor of the province.

Restricted Military Areas in the W Coast of Sweden.—Restricted military areas have been established for the protection of defense installations and areas of special significance to the armed forces of Sweden.

Such an area lies in the South Channel to Uddevalla in the vicinity of **Algon** (57˚55'N., 11˚40'E.) and a separating line is drawn by joining the indicated points.

From the W end of Algon, around the W end of the island to Algon Light, situated 0.2 mile NE.

Then NE for 0.65 mile to position (57˚56'N., 11˚41'E.); continuing ESE for 0.4 mile.

Then NE for 93m, and NNW for 0.3 mile to position (57˚56.3'N., 11˚41.5'E.). The line excludes the charted anchorage in position (57˚56.0'N., 11˚41.7'E.) continuing NE for 1 mile to the W extremity of Lovon and around the N and E coasts of this island to its SE extremity, (57˚56.2'N., 11˚44.5'E.)

Then SSW for 0.9 mile to the E extremity of Algon. Then SW for 0.8 mile to the E coast of Stora Trefoten and circumvents the S coast of this islet.

Then continues WNW for 0.7 mile and to the SE extremity of Lammholmen and along the S coast of this islet.

Then NW for 0.6 mile to the W extremity of Algon, passing through Klovja.

Foreign citizens may not stay in this area without permission; however, a request by providing a special reason, permission may be granted by the Commandant of the West Coast Defense Area in cooperation with the Police Authority.

Such permission may be accompanied by a prohibition to take photographs, make sketches, noting descriptions, or of conducting surveys within the area.

Local Speed Restrictions.—In Swedish waters, vessels are to pass jetties, harbor, installations, and moored boats at the slowest possible speed to avoid damage caused by the wake.

A speed limit of 5 knots must be observed when passing within 90m of light-structures which are in the process of being replenished by work boats carrying gas containers.

Vessels also should reduce speed when passing piers or jetties; especially, where the boats are loading or discharging gas containers and are identified by a red ball displaying in the rigging.

Seal Protection Areas.—Certain islets and skerries, listed below, have been designated Seal Protection Areas. During the period from 15 May to 15 July anchoring within 100m or landing on these islets is prohibited.

Within the arc covered by this sector, the following islets are designated as seal protection areas:

Name	Position
Sockna	58˚50.8'N, 11˚00.4'E.
SV Ramsokal	58˚49.3'N, 11˚01.8'E.
Segelskaren	58˚46.7'N, 10˚59.2'E.
Norra Vaderoarna	58˚35.0'N, 11˚02.0'E.
Bredviksskaren	58˚17.6'N, 11˚22.5'E.
Gaso-skargarden	58˚15.0'N, 11˚21.5'E.
Lynholmarna	57˚52.8'N, 11˚40.5'E.
SV am Tornholmen	57˚50.2'N, 11˚39.0'E.

Quarantine.—An international signal code is used for sending radio pratique messages to the nearest quarantine harbor and **Goteborg** (57˚42'N., 11˚57'E.) is the port designated for the area.

Vessels arriving in Sweden are subject to Quarantine Ordinance (SFS 1975: 1019) enforced in accordance with International Health Regulations of 1969.

Vessels entering Swedish territorial waters from foreign ports should hoist the appropriate quarantine signal Code of International Signals and cease all communication with the shore until pratique is granted.

Generally, any vessel proceeding from one European Community (EEC) port to another need not request pratique.

Special regulations also apply to traffic between Sweden, Norway, Denmark, and Finland.

Ice.—Ice normally forms in the inner leads, fjords, and several harbors within the area covered by this volume. Along the S coast of Norway, freezing starts earlier and with greater severity with increasing longitude, in January and February, especially from **Kristiansand** (58˚09'N., 8˚00'E.) to the **Swedish Border** (59˚00'N., 11˚05'E.).

This creates regular problems for the fishing fleet and smaller vessels; and some harbors to the E of **Jomfruland** (58˚51'N., 9˚36'E.), including Oslofjorden, which are dependent on the local icebreaker service. See section 1.1 on ice condition, ice formation, and the dates.

Off-lying Dangers

Grisbadarna Light and Whistle Buoy in (58˚53'N., 10˚50'E.), moored off the Swedish coast about 3 miles S of the coastal boundary, indicates the SW limits of a group of shoals over which the sea breaks in bad weather.

This area known as Grisbadarna, with depths from 2.4 to 11m establishes the main outer danger in the SW approach to Saekken. The W and S limits of Grisbadarna are marked by buoys. During the fishing season, additional buoys may be moored in this shoal area.

Hallviksgrund, is a shoal bank lying about 1 mile SE of the SE limits of Grisbadarna. The bank has a least depth of 6m and is marked on its N edge by a buoy.

Kosteroarna—Klovningarna (58˚56'N., 11˚00'E.), two small islets marked by a light is located at the N end of Kosteroarna. There is a racon at the light.

Together with this lighthouse, in line with the light structure on Nord Hallso, bearing 053˚, this range forms the W approach to Sekken, Stromstad, and the N end of Koster Fjorden.

Depths—Limitations.—The approach is reported to accommodate vessels with a draft of 8m passing S of Grisbadarna lighted buoy and maintaining on the 053˚ range, between Hallviksgrund and Det Grunda.

Directions.—At about 1 mile SW of Klovningarna, a vessel should alter course to pass between the shoals S of Stora Drammen and the lighted buoy marking the N end of Sma Drammarna, and then between Klovningarna and the lighted buoy marking the NW edge of Klovningsgrund about 0.3 mile SE.

Caution.—The range line clears the W edge of Sma Drammarna by only a little more than 91m; therefore, it is advisable to open the lights slightly to the N, particularly in heavy weather, when the island comes broad on the bow.

In this approach, fishing vessels may be encountered; therefore, a vessel should maintain a good lookout, particularly in periods of poor visibility.

KLOVNINGARNA LIGHT

Faerder to Ramskar.—From a position 3 miles SSE of **Faerder Light** (59˚02'N., 10˚32'E.) which stands on the middle islet in the Tristeinane or Lille Faerder group.

At the S end of Oslofjorden, a series of Traffic Separation Schemes are established along the coastal passage leads SSE for about 20 miles, in deep water outside the 50m depth contour, to a position about 8 miles SW of **Ramskar Light** (58˚45'N., 11˚00'E.).

Kungsvikshamn (59˚00'N., 11˚08'E.) lies on the N side of the entrance to Dynekilen, a fishing harbor with small craft.

This harbor is approached from W through a channel S of **Ledsundholmen** (58˚59.6'N., 11˚06.7'E.) dredged to 3.5m that has a channel draft of 3m.

There is a speed limit of 5 knots inside the harbor that is protected by a breakwater and a small islet.

Many channels within Swedish waters have an established channel draft. This is the maximum draft a vessel can have when assisted by a pilot and proceeding in the channel at MSL. The channel drafts are based on the tabulated value called reduction to sounding or a chart datum established at MSL. However, a pilot does not hold any guarantee that a vessel can safely proceed in the channel under all conditions.

Pilotage.—In Swedish waters pilotage is compulsory along certain leads connecting ports or along the coast.

Vessels subject to compulsory pilotage vary in size and type according to location. See Pub. 140, Sailing Directions (Planning Guide)North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

A Swedish Pilot Station at Nordkoster provides pilots for the approaches to Klovingarna, Koster Fjorden, Stromstad, or to Dynekilen.

Requests for pilots to take vessels to and from all ports between the Norway-Sweden boundary and Sotefjorden is also made in most circumstances through this station.

A lookout is maintained by day only, from the towers on Kosterbonden.

Normally, the boarding areas for Nordkoster Pilot are, as follows:

1. In Koster Fjorden, 1.5 miles E of Nordkoster.
2. About 4 miles W of Nordkoster.

3. In the fairway 1.5 miles S of Ramskar Light.
4. At the Norway-Sweden border near Nord Hallso.

The Nordkoster pilot working-hours are from 0700 to 1600 Saturdays, Sundays, and workdays; reservations and service can be made within a 24 hour period. ETA should be provided to pilots 5 hours in advance. The pilot station and pilot boats are equipped with VHF.

5.2 Nordkoster and Sorkoster (Syd-Koster) are the largest islands of the Kosteroarna and are separated by a narrow, shallow channel available only to small vessels. These main islands are good landmarks on this Swedish Coast.

In hazy weather, they are visible at a greater distance than the mainland. The islands, practically devoid of trees and dark color, exhibit a sharp contrast with the lighter coast behind. Koster, the summit of Nord Koster, is 59m high and can be identified by the conspicuous ruins of two old lighthouses.

Prominent on Sor Koster are **Valfjallet** (58˚53'N., 11˚01'E.), surmounted by a small beacon and a chapel close NE.

Ursholmen (58˚50'N., 11˚00'E.), the largest island in the SW part of Kosteroama is dark colored and can be identified by its two lighthouses.

The area between Ursholmen and Sorkoster has many dangers, and scattered islets, further complicated by the intersection of fishing lights and channels. The area should not be entered without local knowledge.

URSHOLM LIGHTHOUSE

To the WNW of Ursholmen at about 1 mile, there is a considerable danger in Bredgrunden, a compact group of reefs marked by a buoy.

Ramso (58˚50'N., 11˚04'E.), is the largest island in the SE part of Kosteroarna. The fishing harbor on the NW side of the island with some facilities has general depths, ranging from 3 to 3.7m.

Ramsokalven and Ramsholmen two islands NW of Ramso, form to their W a narrow channel, marked by lights, which is available to small vessels with local knowledge that are in transit to or from Koster Fjorden.

5.3 Koster Fjorden (58˚52'N., 11˚06'E.) forms an excellent coastal route connecting the waters of Olsofjord with those of the Skagerrak to the S. This main channel between Kosteroama and the coastal islands to the E is deep and comparatively clear of dangers in the fairway.

Kosterfjorden is authorized for a draft of 10m. The channel can be approached from the N by passing E of Tisler, or from the W at Grisbadarna Lighted buoy.

The SW approach to Koster Fjorden is in the vicinity of Ramskar.

The approaches to Koster Fjorden between Ursholmen and Ramskar are recommended only for small vessels as there are numerous shoals and dangers in this vicinity.

Ramskar (58˚45'N., 11˚00'E.), a large isolated rock, is situated about 4 miles S of Ursholmen and marks the S end of a group of islets and shoals that extends NNE to Kosteroama.

The light structure on the rock is towering and easily seen from any direction. A racon transmits from the 19m structure.

A 14m patch, marked by a buoy, lies about 1 mile S of Ramskar.

Persgrunden (58˚42'N., 10˚51'E.), a group of dangerous off-lying shoals, have a depth of 2.4m, 6 miles SW of Ramskar. The outer patch is marked by a light and whistle buoy, equipped with a radar reflector, and also by a buoy, both to the S. The inner patch is marked by only a buoy moored close to the N. These shoals, steep-to and situated some distance from the coast, render them a serious threat to navigation, particularly in periods of poor visibility.

Norra Spiran and Sodra Spiran, which lie 2 and 2.25 miles SSE of Ramskar, respectively, have depths of 8m.

A 12m patch 1.75 miles SSE of Ramskar is marked on its N side of a buoy.

5.4 Anchorage.—The best anchorage in Koster Fjorden is in Kosterhammen, a bay on the E side of Sorkoster.

Large vessels can anchor in depths up to 24m, mud, but anchorage is prohibited within 183m of the shore of Syd-Koster.

Small vessels with local knowledge can take anchorage in the narrow channel of Kostersundet in depths of 5 to 7.4m, clay, opposite the pilot station.

On the E side of Koster Fjorden, small vessels with local knowledge can take anchorage in Styrso Hamn between the SE side of Styrso and the SW side of Norra Oddo where there is a narrow but sheltered fjord. The depths in the anchorage range from 17 to 18m, clay, but the approaches are available only to vessels drawing up to 4.9m.

KOSTERSUNDET FROM SW

Anchorage can also be taken by small vessels with local knowledge in Slato Flo on the E side of Koster Fjorden between the islands of Salto and Rasso. Although the anchorage in this cove has depths of 2 to 12.8m, the bottom is rocky, and the entrance channel, between Stora Flatskar and the light structure, close N, is narrow and tortuous and requires a great deal of caution.

Directions.—Vessels approaching Koster Fjorden from the SW should keep in the SW white sector of Ramskar Light passing about 1 mile SE of Persgrunden Light Buoy. When the SW white sector of **Svangen Light** (58˚48'N., 11˚07'E.) comes to bear, approximately 045˚, steer for it to pass S of Ramskar and between the buoys marking the dangers to the SE.

When within Ramskar and slightly to the N, alter course to the white sector of **Vattenholmen** (58˚53'N., 11˚06'E.) with the light-tower ahead bearing approximately 010˚.

When NE of Ramso and with the northern white sector of Svangen bearing 169˚, astern, alter course to approximately 349˚ to proceed to the pilot station E of Nordkoster.

Vessels approaching Koster Fjorden with directions given above, should be aware of the general current which enters the area on an ENE set with rates from 1 to 2 knots.

The influence of SW gales will further strengthen the set of the current and therefore caution is advised.

SVANGEN LIGHT (WHITE)

Nord Hallso (58˚58'N., 11˚05'E.), is an island, located on the S side of the entrance to Sekken. Nord Hallso reddish yellow and rising to two hummocks, slopes steeply on its NW side. Reefs extend up to 0.2 mile from the S end of the island and a light marks the N shore. The island can also be identified

by a large white square mark, with a black border, painted on a steep slope on its N part.

Tjurholmsknappen (58˚58'N., 11˚06'E.), is situated about 0.7 mile NE of Nord Hallso. This is a group of rocks marked by a light. Tjurholmen lies directly N of Tjurholmsknappen.

It has two small white beacons at its NW end and a white disused light tower, at its NE end.

Dynekilen Inlet extends NE into the Swedish coast for about 3 miles. Numerous dangers lie in this channel but drafts to 7m can be taken to Ladholmen, near the head of the inlet, with local knowledge. Vessels requiring pilots can request them from the pilot station on Nordkoster. There is anchorage off the town in depths from 7.4 to 11m, mud, but caution is necessary to avoid the submarine cable close to the W.

Langoarna (58˚57'N., 11˚07'E.) are a group of islands lying close-in off the coast between Dynekilen and Stromstad. They are comprised of Nord Lango, Syd Lango, and Syd Hallso, including a number of small islets and rocks. There are no outstanding features in this group when approaching from the N or W.

5.5 Approaches to Stromstad—Langorannan.—The inner approach from NNW passes through **Langirannan** (58˚57.5'N., 11˚07.0'E.), a narrow channel between Langoarna and the mainland.

This channel is approached between Tjurholmsknappen and Nord-Hallso, 0.6 mile SW, is entered 1 mile E of Nord-Hallso Light.

The channel depth is 6m and the route that follows recommended track shown on the chart is marked by leading lights, (58˚56'N., 11˚08'E.)

However, the channel width is reduced to 45m where it passes between 2 shoals at its S end and local knowledge is required.

Inner approach from W is through a channel known as Stora Inloppet (Bulthalan) that passes N of **Flatskar** (58˚56.0'N., 11˚06.7'E.). This route leads from the N end of Kostertfjorden through a winding but a well marked channel along the recommended track shown on the chart.

The channel depth is 8m and that makes it the deepest of the entrance channels. Inner approach from WSW passes through a narrow channel known as Sodra Inloppet which is entered S or N of **Kibblingarna** (58˚55'N., 11˚05'E.).

This channel, which leads generally ENE for about 2 miles along the recommended track shown on the chart, has a channel draft of 6m. Local knowledge is required.

The combination of an outer approach from N or from SSW, (58˚44'N., 11˚00'E.), with the inner approach from W, (58˚56.0'N., 11˚06.7'E.), affords the deepest approach to Stromstad with a channel draft of 8m to Sodra Hamnen.

There is a 7 knot speed limit in Langorannan; in June and August this speed limit is lowered to 5 knots.

Syd-Lango range lights, shown from the SE end of the island, when in range 161˚ lead through the fairway of Langorannan. Shoal spits, with depths of 3.7m and less, extend into the channel between Syd-Lango and Lilla Trollholmen considerably restricting the fairway here. The outer limit of each spit is marked by a buoy with the range line nearly centered between.

Farther S the fairway lies between the S end of Syd-Lango and Gasesk and then between Daniel Beacon and the red buoy marking the S extremity of the reefs extending from Gasesk. Then the channel trends E between the islands of Stromstad and Furholmen, a narrow shoal encumbered fairway requiring local knowledge.

Submarine cables are laid between Nord Odo and Syd-Koster and Nordkoster passing between Svartskar and Kebblingarna.

5.6 Stromstad (58˚56'N., 11˚10'E.) (World Port Index No. 23870), situated on the E shore of the Skagerrak, is well-sheltered and ice-free. The harbor is divided into two coves known as Norra Hamnen and Sodra Hamnen.

The main facilities, protected by a breakwater are located in Sodra Hamnen. The port exports considerable amounts of granite, stone, fish, and wood.

Winds—Weather.—In winter, winds blow primarily from the SW usually shifting to NE in the spring. Summer winds predominate from the W but mean wind speeds are only 5 to 6 knots due to the protection of the land areas.

Gales in the port area are few, usually less than about 1 per month.

Fog averages 4 days a month in winter but is rare in summer. Morning fog is prevalent from February to April due to S winds.

Ice.—Ice is usually not a problem at Stromstad, but during severe winters some hindrance to vessels may occur in February. Clearing usually is complete by early March, except for drift ice,

Tides—Currents.—The tidal range at Stromstad is about 0.3m; winds from the W raise the water level but E winds cause it to fall.

Depths—Limitations.—Norra Hamnen, with general depths from 8.5 to 15m, is primarily for ferry and archipelago traffic. There are two quays in its S part, the largest 100m long has a depth of from 2.5 to 4m alongside. The S timber jetty at the N end of the harbor is 20m in length with depths of from 4 to 6m alongside; the latter depth is at the pierhead.

Sodra Hamnen is divided into two sections including fishing harbor quays, guest harbor berths, and a great number of small craft berths. There are concrete berths with a total length of 480m and depths of up to 9m alongside. Two quays at Torskholmen, on the S side of the harbor close E of the head of the mole, have a total length of 135m and depths from 4 to 9m alongside.

The ro-ro berth, situated 0.2 mile S of the harbor entrance, is a 60m quay with a dolphin off its S end, extending the berthing length to 75m, with a depth of 7m alongside.

The largest vessels to be accommodated at Stromstad, generally did not exceed 3,000 dwt and the least depth allowed alongside was 7.3m.

A tanker berth 80m long, with a depth of 13.5m alongside, is situated at Roseberg, 0.6 mile S of the entrance to Sodra Hamnen. Daytime transits of the channel to the tanker berth are normally limited to tankers up to 40,000 dwt, with a maximum draft of 9m, although tankers with a maximum draft of 11.5m can be accommodated with prior notice. Night transits of the channel are limited to tankers up to 20,000 dwt, with a maximum draft of 7.6m.

Pilotage.—Vessels approaching from seaward and through Koster Fjorden can board pilots E of Nordkoster. See Nordkoster for additional information.

Pilotage is available but not compulsory. It is available between 0700 and 1900 daily. Vessels should contact Stromstad Pilot Station on VHF channel 16.

Speed is regulated to 5 knots in the harbor.

Anchorage.—Vessels approaching Stromstad via Stora Inloppet will find good anchorage about 0.2 mile S of Daniel Beacon in depths from 15 to 22m, clay.

Large vessels can find anchorage off Stromstad about 0.2 mile SW of the entrance of Sodra Hamnen in depths from 16 to 18m, clay. Small vessels can find anchorage in Norra Hamnen in depths from 8.5 to 15m, clay.

Caution.—A submarine pipeline extends about 250m SW from the NE side of Norra Hamnen.

5.7 The N approach to Havstenssund on this part of the Swedish coast is marked by **Bissen Light** (58˚48'N., 11˚09'E.). Two beacons, close NE of the lighted structure, located on the SW extremity of Bissen Island, when in line 138˚, lead in clear of the dangerous limits of the fairway and within the outer bounds of the NW white sector of the light. It is reported these beacons were difficult to identify from a distance, particularly the front beacon.

The S side of Bissen Island is steep-to and vessels usually approach on the range beacons until 0.3 mile from the SW shore when direction should be altered S to pass close to the S.

When clear, the channel leads SE, with Bissen Light bearing 329˚ astern, between the islands of Rafton and Brurholmen and will accommodate vessels with drafts to 5.5m, destined for Stridsfjorden or Sannas.

Anchorage.—Anchorage is available with local knowledge in Stridsfjorden where good shelter affords depths from 8.3 to 11m, clay. The entrance to the cove is deep but quite narrow and caution is advised.

Vessels with local knowledge can anchor off the village of Sannas from 8 to 9m, clay.

The S approach to Havstenssund is marked by **Vacker Light** (58˚43'N., 11˚10'E.). Navigating this passage requires local knowledge as it is encumbered with reefs and shoals.

During W gales, the sea breaks heavily on these dangers and under these extreme conditions, the channel should not be used at all.

Further limitations of using this channel, are that the narrowest part at Havstenssund is 4m and an overhead cable with a height of 39m also extends across the narrows close S of the town.

Approach from the W is made in the white sector of Vacker Light with the light structure bearing 079˚. This course leads close N of Kistan, an unmarked rock just above water, and caution is required.

Approach from the S is made in the S white sector of Vacker Light bearing 018˚. Sodra Grenen and Knutsgrund, two shoal patches each marked by a buoy, border the fairway about 1 mile SSW of Vacker Light and form the main dangers from this direction. When approximately 0.3 mile SSW of Vacker vessels alter course W to the alignment of Havstenssund Range Lights, bearing 013˚, which lead close W of the light structure and into Southern Channel.

Havstenssund (58˚45'N., 11˚11'E.) (World Port Index No. 23880), a fishing port which lies in the sound between Hallso and the mainland, will accommodate small ocean going vessels with local knowledge. There are several piers at the town, the largest reported to be in the N cove has a berthing head of 84m with an alongside depth of 4.9m.

South of the concrete quay there is both a wharf with a 20m quay, depth 4m, and an 80m long floating wharf for visiting small craft.

The tidal range is about 1m. Drafts to 5.5m can enter from the N as stated earlier.

Pilotage.—Pilots can be obtained for Havstenssund at Nordkoster or at the District Station in Lysekil.

Speed within the port area is restricted to 5 knots.

It is prohibited to discharge refuse or ballast in the approach channels within 3 miles N and 2 miles S of Havstenssund.

5.8 **Bramskar** (58˚39'N., 11˚09'E.), a small island, is situated at the W approach to Grebbestad. The island, marked by a light is conspicuous when vessels proceed in from seaward. An islet and several rocks lie close W of Bramskar, and Moro, a yellowish island with an edifice of stones on the summit, lies about 0.5 mile NNW.

Otteron Island, situated about 1 mile E of Bramskar Light, is high, dark, with some trees growing on its higher sides. Pinno, close NW of Otteron, forms between it and the latter, the main channel to Grebbestad, a rock strewn and danger filled fairway for which local knowledge is recommended.

Stangeskar Lighthouse, situated on the NE extremity of the island of the same name, lies about 1 mile ENE of Bramskar and marks the junction of the W and N approach routes to Grebbestad. Drafts to 4.4m can be taken through the channel between Bramskar and Stangeskar but vessels with drafts to 6m can approach the port by entering W of Vacker Light and then proceeding SSE to Stangeskar.

Djupskar Lighthouse, situated on the E extremity of the islet of the same name, stands about 1 mile SE of Bramskar, and is a conspicuous mark when approaching the area from the NW. The light is also a useful aid when proceeding to Fjallbacka.

Svartskarsgrund, a rock awash about 1 mile NNW of Stangeskar, must be passed with caution when using the N route. It is marked by a black and white cylindrical cairn surmounted by a staff and cone, the whole about 6m in height.

Haskar (58˚40'N., 11˚13'E.), a rounded islet with a white mark on its SW side and a rock awash off its SE extremity, lies at the entrance to the fairway between Otteron and Pinno.

The channel is marked S and E of the islet by buoys and the sectors of Otteron Light but local knowledge is recommended. Svinnas Range Lights, in line 043˚, lead through the fairway from E of Haskar to S of the front light structure, where course can be altered more to the E for Grebbestad.

5.9 **Grebbestad** (58˚41'N., 11˚16'E.) (World Port Index No. 23890), a small port, is located at the head of Grebbestadkilen, a cove about 1 mile long and 0.25 mile wide. Range lights situated at the head of the cove and in line 010' lead into the anchorage which can be entered by vessels with local knowledge drawing up to 4.5m. There are two quays available in the harbor, each with a length of 79.3m and a depth

alongside of 4.5m. There are also 60 to 80 moorings for yachts with an alongside depth of 2 to 5m.

Pilots for Grebbestad may be boarded off Nordkoster in the N, or Lysekil, the District Pilot Station to the S. Clearance is obtained from the custom house in Stromstad.

There is a speed limit of 5 knots in the harbor N of Vadskar.

Ice generally occurs during the months of January and February.

Anchorage can be taken by small vessels between Koskar Beacon and Vadskar Islet, S of the harbor, where there are depths of 6.7 to 9m, sand and clay.

Vaderobod (58˚33'N., 11˚02'E.), a high islet, the highest part of which approximates a shed or barn, is located in the SW part of Vaderoarna and is the first portion of the group sighted when approaching from that direction.

Vaderoarna is predominately reddish brown in color and is not distinguishable from the islands close into the coast, until about 4 miles distant.

Storo, situated in the NE part of the group, is the highest and also the largest island. A disused pilot lookout tower is situated on its S part.

The island of Lygno, located about 2 miles E of Vaderobod Lighthouse, (equipped with Racon), lies in the SE part of Vaderoarna and has a beacon on it.

Skalholmen Lighthouse, on the E extremity of the island of the same name, lies close E of Lygno and marks the W limits of Vadero Fjorden, the channel between Vaderoarna and the mainland.

Kilen, a 4.5m patch marked by a buoy, lies on the NW side of Vaderoarna about 4 miles NNW of Vaderobod Lighthouse.

Spruttabrotten, a group of rocky patches with depths of 1.2 to 2.7m, lies about 1 mile N of Vaderobod and is marked on the NW side by a buoy.

Skalgrund, marked by a buoy close S, is a rocky 2m patch which lies about 1.5 miles SE of Vaderobod and forms the southernmost danger of Vaderoarna. Depths to the S and W of this shoal are irregular and caution is advised especially in heavy weather. An isolated 8.7m patch lies about 1.5 miles WSW of Skalgrund.

A channel leads from seaward through Vaderoarna passing close S of the light on Stora Plogjarnet and then into Vadero Fjord. It can be used in good weather by vessels drawing up to 5.8m and possessing local knowledge.

Anchorage.—Small vessels with local knowledge can take anchorage in the narrow channel between Storo and Erholmen in depths of 13 to 18m, sand and clay. Strong currents frequently set through this channel but mooring rings on the shore are available.

During strong W winds the sea breaks well off the islands and there is frequently a strong current setting down on Vaderoarna.

5.10 Sodra Syster (58˚36'N., 11˚09'E.), a small awash rock surmounted by a lighthouse, lies on the E side of the N entrance to Vadero Fjorden and also marks the W approach to Fjallbacka.

Several dangerous shoals with depths of from 2 to 5m lie between Sodra Syster and Norra Syster, about 0.7 mile N.

Stora Ryggen, a rocky 4.4m patch marked by a buoy, lies in the center of Vadero Fjorden about 1.25 miles W of Sodra Syster. This danger lies at the W limit of the 6.4 to 10m shoals which extend westward and up to 1.25 miles N and S of Sodra Syster. Vessels transitting the strait are recommended to pass about 0.3 mile W of the above buoy with Skalholmen Lighthouse ahead bearing about 185˚.

Stora Haskar, a high yellowish-red islet, lies on the SE side of Vadero Fjorden, a little over 2 miles E of Skalholmen and forms an excellent mark when approaching the strait from the SW.

Svartingen, a group of awash and submerged rocks, lies up to 0.5 mile NW of Stora Haskar and forms the main danger of the SE side of Vadero Fjorden.

Fjallbacka (58˚36'N., 11˚17'E.) (World Port Index No. 23900), a small port, is a loading place for timber, fish, preserves, and grain; it is approached by narrow channels and allows a draft of 7.3m.

The approach is made from the W via Systers Inlopp, the restricted channel leading between Sodra Syster and Brodern, a low rock, about 0.2 mile N.

SODRA SYSTER LIGHT

The channel is to be steered in the white sector of Brantelholmen Light, bearing 095˚, passing close S of that islet and then between the light on the NW extremity of Trybergsholmen and the islets close N.

There is a white patch painted on the W end of Trybergsholmen and the dangers in the channel hereabouts are marked by buoys, but within Brantelholmen local knowledge is recommended. There is a speed limit of 7 knots in the approaches to Fjallbacka.

The S channel to Fjallbacka is entered SE of Stora Haskar in the white sector of Sotens Svartskar Lighthouse bearing 050˚.

A draft of 6m can be taken to Fjallbacka by this channel but local knowledge is required. Vessels pass NW of Sotens Svartskar, between Sandviksholmen Light and Galjeberget and then W of Kalfo and Kalvoskar Light and through the islands S of Hvalo.

The town of Fjallbacka is situated on the E shore of Fjallbackafjorden, a small bay formed within the island of Hvalo. Vessels approaching can pass N or S of the latter and proceed to anchorage off the town in 7.5 to 10m, good holding ground.

On the fjord SSE of Muso, there is a spacious anchorage with a depth of approximately 18m having a clay bottom.

Pilotage.—Pilots can be acquired from Nordkoster in the N or at the District Pilot Station at Lysekil in the S. Clearance is secured through the customhouse at Stromstad. Facilities at the town consist of one quay, the largest about 95m long, with an alongside depth of about 5m. Ice usually obstructs navigation from January to March.

Sotefjorden—Swedish Coast

5.11 Saltskar Beacon, a conspicuous navigational aid, stands on the islet of the same name and stands in the N part of Sotefjorden. This structure, painted black with a circular topmark, appears as a figure of an old woman. A white beacon 3m high, is situated close to the W.

Sotefjorden is heavily encumbered with submerged and awash rocks and shoals, most of which lie unmarked E of the meridian of 11˚10'E. Kalen, a reef awash at LW and marked by a buoy close W, lies about 2 miles WSW of Saltskar Beacon and is the westernmost danger in Sotefjorden.

Numerous dangers lie NE and SE of Kalen and up to 2.5 miles S of Saltskar, including Mellangrund, a 3.2m patch about 1 mile to the SSW which is marked by a buoy.

Langholmen and **Magholmen Light Structures** (58˚32'N., 11˚14'E.), in line bearing 006˚, lead through the middle of Sotefjorden between Saltskar and the Hunnebostrand approach range. Vessels up to 6m in draft can use this channel but local knowledge is recommended.

Hunnebostrand (58˚26'N., 11˚18'E.) (World Port Index No. 23910), a small port situated in the SE part of Sotefjorden, is approached from seaward with Soo Front Range Lights in line bearing 115˚.

Leading close SW of Uggenabben, an islet with a beacon, the channel trends between two buoys marking the dangers NW of the entrance and then into Ramsviksfjord, between Sodra Groto and Soo Front Range Light.

Vessels with drafts up to 4m can proceed through Ramsviksfjord, S of Soo Island and on to Ulebergshamn.

This range leads over LW depths of 4 to 4.9m, E of Soo to Hunnebostrand.

Vessels with drafts to 6.4m can, in daylight, from S of Uggenabben, proceed NE rounding Andersbadan and Sodra Brott to head SE into Osofjorden. There is a speed limit of 3 knots. From the latter, course is altered to round Knifsholmen to the N and then S to the anchorage in Nordfjorden.

Depths—Limitations.—Angbatsbryggan Wharf, in the N part of the harbor basin, has a 50m stone quay and a 70m wooden quay, with depths of 4 to 4.5m.

Mellankajen Quay in the S part of the harbor basin, has a 25m wooden quay with depth of 3.1 to 3.3m.

Sodra Kajen Quay, at the strait between the mainland and Goranso island, has a 75m long concrete quay with depths of 4.5 to 5m.

Lahallakajen Quay, S of the town, has a 70m concrete quay with a depth of 4.5m.

SOTENS SVARTSKAR LIGHT

Accommodations at Ulebergshamn is restricted to two small piers with depths of from 2.7 to 4.6m alongside. There is a speed limit of 5 knots in the harbor.

Pilotage.—Pilots for Hunnebostrand and Ulebergshamn can be secured from Nordkoster for vessels coming from the N or at the District Station at Lysekil if approaching from the S.

Anchorage.—Anchorage can be taken off Hunnebostrand by vessels with drafts to 6.4m in depths of 10 to 15m, good holding ground. At night vessels can proceed into Ramsviksfjord and anchor about 0.7 mile W of the town in 8.7 to 16.5m, mud. Anchorage is also available for small vessels between Ulebergshamn and Knifsholmen in depths of 10 to 13m, mud. Local knowledge is required for all the approaches.

5.12 Bovallstrand (58˚29'N., 11˚20'E.) (World Port Index No. 23905), a conspicuous cleft in the coast, about 2.5 miles N of Hunnebostrand, is bordered on its S side by Sparoklofva, a peaked hill 111m high which is visible from seaward up to a distance of 28 miles in good visibility. The fjord is approached from the vicinity of Uggenabben, steering NE through the dangers NW of Osofjorden, but local knowledge is recommended.

There is a speed limit of 3 knots within the port. Osofjorden can be entered in daylight only by vessels drawing up to 6.4m and Nordfjord can be approached from the N with the same draft. There is a speed limit of 5 knots in the harbor.

Depths—Limitations.—Several small piers with depths up to 5.2m at the seaward ends are situated at Bovallstrand and vessels with drafts up to 5m can berth at their heads. Pilots can be secured at Nordkoster or from Lysekilo.

Anchorage.—Good anchorage can be obtained by ocean going vessels off Bovallstrand in depths of from 10 to 17m mud, but clear of the submarine cable close E.

Soteskar (58˚25'N., 11˚11'E.) lies about 1 mile off the mainland at the S end of Sotefjorden.

The lighthouse on Mjolskar marks the inner route S from the 006˚ to 186˚ range line of Sotefjorden and vessels with local knowledge drawing up to 6m can pass through the group.

From offshore, Sotebonde, a conspicuous hill 58m high, rises on the shore ESE of Soteskar and forms a good landmark from off the coast.

Lerberget, with a depth of 5m, lies about 1 mile SW of Soteskar and is the principal danger to vessels rounding the island to the W.

Mickelbade, with a depth of 6.9m, lies a little over 0.5 mile NW of the island and presents a danger. A 8.2m patch lies 0.5 mile SW of Mickelbade.

5.13 Tryggo (58˚24'N., 11˚14'E.), a low flat island with a light beacon on its W extremity, lies at the S end of Sotenkanalen and forms the W side of the small fishing harbor of Olstenshamn where sheltered anchorage can be taken by small vessels with local knowledge.

Olstenshamn is approached from W, S of the buoys marking Bredgrund and Rodgrund where there are depths of 9 to 15m in the channel. Drafts to 7m can be taken to the anchorage and drafts to 4.6m can be taken through Sotenkanalen.

Segebaden (58˚21'N., 11˚09'E.), a 5m shoal marked by a buoy on its W side, lies about 3.5 miles SW of Tryggo Light Beacon with Stora Haskar between. Det Grunda, an 8.2m patch about 0.7 mile NW of Segebadan, is also dangerous, being unmarked and in the shipping lanes from Vadero Fjord.

Sorgrundsberg, with a least depth of 10.5m, lies marked about 0.4 mile SSW by a lighted buoy about 3 miles SSW of Hallo.

HALLO LIGHTHOUSE

Hallo (58˚20'N., 11˚13'E.), is marked by a conspicuous lighthouse. The main entrance channel to Smogen, also known as the southern approach, leads between Hallo and Stenskar, about 0.3 mile E, and can accommodate vessels with drafts up to 7.9m.

The N approach channel to Smogen lies about 0.7 mile N of Hallo Lighthouse and leads E from Tryggo Range Lights to between Klefven and Pengeskar, here being restricted to vessels with maximum drafts of 6m. The area between Hallo and Pengeskar is encumbered by islets and shoals and should not be entered.

5.14 Smogen and **Gravarne** (58˚21'N., 11˚14'E.) (World Port Index No. 23930 and 23920) are two fishing ports located in the NW part of Malmo Fjord and within 1 mile of each other. Smogen, situated between Kleven and the main island, is narrow but fairly easy of approach.

Gravarne, situated on the E side of Gulskarshamen, between the island of Smogen and the mainland, has good outer quayage and two basins.

Winds—Weather.—Winds predominate from the SW a good part of the year. Winds from the NE occur more frequently in winter but observations indicate a good deal of variance.

Fog is frequent in winter, averaging 6 days a month in December, but in summer it is rare.

Temperatures vary from average lows of 11˚C in winter, to average highs of 27˚C in summer. Although some ice forms in the channels in winter, it generally is not too thick and usually does not restrict navigation.

Depths—Limitations.—The least charted depth in the main approach channel between Hallo and Stenskar is 15m.

Within the harbor area there are depths of 9.4 to 14m on the tracks but numerous shoals lie in the vicinity and local knowledge is required.

Smogen, on the S part of the island of Smogen, is bordered by quays on both sides with depths from 3 to 7.5m alongside.

There is a fishing harbor off the E end of the port which has depths from 4 to 4.9m within.

Gravarne has 500m of quayage at Gulskarshamen with depths of 4.5 to 9m alongside. Small oceangoing vessels with drafts of 7.9m can moor here. The basins at the town have depths of 3 to 4m with the dividing pier having 4.7m at its head.

Gravarne Range Lights bearing 024˚ lead through the main channel to within approximately 0.4 mile of the front light.

Two fishing lights located at Hasselon when in range 349.5˚ indicate the turning point from the main channel.

Byttelocket Beacon, a stone cairn situated on a rock in the middle of the harbor, divides the approaches to Smogen and Gravarne and forms a good daymark when proceeding in.

Southern Approach to Smogen

Kungshamn Range Lights bearing 016˚ lead to the N anchorage of Gravarne. Two lights at the head of Smogen in range 284˚ lead into that harbor.

Numerous buoys and beacons mark dangers in the harbor and light sectors assist in night navigation throughout the port; however, local knowledge is recommended.

A bridge connects Hasselon, the N part of Smogen, with the mainland close S of Kungshamnsberg. It has a vertical clearance of 26m.

There is a speed limit of 5 knots in the harbors of Smogen, and in the channels of Gravarne and Fisketangen.

Pilotage.—Pilots for Smogen are boarded at the pilot station off Lysekil. Vessels coming from the N may board the pilot off Nordkoster if desired. Pilot Lookout Tower on Smogen consists of a platform supported by posts, 7m in height, surmounted by a pointed roof and flagstaff; which is best seen between 101˚ and 169˚.

Also, a water tower is situated 370m NNE, white, funnel-shaped and visible at long range.

Also see section 5.1 on pilotage in Swedish waters.

Tides—Currents.—The range of the tide at Smogen is only about 0.3m, southerly winds usually cause a strong N current in the vicinity of Hallo and caution is advised.

Anchorage.—Small vessels with local knowledge can take anchorage about 183m N of Byttelocket Beacon in depths of 16.5 to 20.1m, mud and clay.

Kungshamn affords anchorage to vessels with local knowledge in depths of 10 to 16m, clay. There is a boat quay at the town with a depth of 3m alongside.

Caution.—Numerous dangers marked by buoys exist in the harbor area.

5.15 Malmo Fjord lies SW and S of the S point of **Malmon** (58˚20'N., 11˚20'E.) and forms the outer approaches to Ornefjorden, Abyfjorden, and Brofjorden from SW and to Lysekil from NW.

Brofjorden and its approaches lie within the area of the Uddevalla Reporting and Information System.

Malmobrotten and Bottebrotten, two groups of islets and shoals, lie nearly in the middle of Malmo Fjord.

Secondary channel, from W passes N of Brondebrotten that has a channel draft of 8m. This approach to Brofjorden or Abyfjorden is made between the spar buoys marking Malmobrotten and Bondebrotten in a least depth of 9.8m.

The SW approach to Malmo Fjord is made with the NW extremities of Vastingskaren and Lilla Kornoarna in line bearing 059˚. This course passes close W of a least charted depth of 7.8m and is altered to 043˚ when about 0.3 mile from Vastingskaren, but local knowledge is required.

Regulations.—The Uddevalla Reporting and Information System covers the W coast of Sweden from the approaches to **Brofjorden** (58˚21'N., 11˚25'E.) to the approaches to **Marstrand** (57˚53'N., 11˚37'E.). This coastal stretch include **Lysekil** (58˚16'N., 11˚26'E.), **Vallhamn** (58˚01'N., 11˚42'E.), **Stenungsund** (58˚04'N., 11˚49'E.) and **Uddevalla** (58˚21'N., 11˚55'E.); and their approaches.

The reporting system is mandatory for vessels greater than 300 grt; vessels greater than 50m in length; and towing vessels where the length, including the tow, is greater than 50m.

The N limit of the reporting system is bound by lines joining the following positions:

1. Position 58˚ 10.4'N, 11˚ 23.1'E.
2. Hatten Lighted Beacon.
3. Skramjas Ungar Buoy.
4. Brofjordens Angoring Lighted Buoy.
5. Sorgrundsberget Lighted Buoy.
6. Segebaden Buoy.
7. Position 58 ˚23.0'N, 11 ˚15.7'E.

The S limit of the reporting system is bound by lines joining the following positions:

1. Position 57˚ 47.5'N, 11˚ 42.3'E.
2. Hatteberget Light.
3. Position 57 ˚58.9'N, 11˚ 31.3'E.

Vessels entering the reporting area must report to the appropriate center, giving their name, call sign, position, proposed route, and destination.

In addition, vessels must report the same information when arriving at or departing from a berth; when anchoring or weighing anchor; and during a change in route, grounding, or collision.

When within the reporting area, vessels must maintain a continuous listening watch on VHF channel 11 or 12, as appropriate. They must also report their name, position, and destination when leaving the reporting area and when passing the following reporting points, which are best seen on the chart:

1. Hatteberget-Marstrand—VHF channel 11.
2. Mitholmarna-Marstrand—VHF channel 11
3. Halsefjord-Marstrand—VHF channel 11
4. Strandanas-Marstrand—VHF channel 11
5. Eggskar-Marstrand—VHF channel 11
6. Salofjord-Marstrand—VHF channel 11
7. Havstensfjord-Marstrand—VHF channel 11/Lysekil —VHF channel 12.
8. Koljofjord-Lysekil—VHF channel 12
9. Islandsberg-Lysekil—VHF channel 12 (inbound).

Abyfjorden, approached in the white sector of the western Drottningudden Range Light, ahead bearing 003˚, is a long but occasionally shoal fjord, capable of accommodating vessels with drafts up to 7.9m. Caution is necessary when proceeding through the narrows E of the S end of Kalfven as depths decrease to 7.3m close to the approach course range.

Abyfjorden affords good anchorage everywhere, the bottom being clay. There are several loading places on each shore, and most have piers with depths from 4 to 4.5m alongside. At Fogelvik, about 1 mile above Drottningudden, there is a berth with a 6.4m depth, alongside.

5.16 Brofjorden, entered SE of **Groto** (58˚20'N., 11˚22'E.), extends 4 miles NE. Scanraff Oil Refinery, which is served by Brofjorden Oil Harbor is situated on the SE shores of the fjord. Trommekilen branches SE from the fjord on the S side of Ryxo, situated 2.25 miles NE of Groto.

Depths—Limitations.—Raoljehamnen, a crude oil berth, situated on the E side of Brofjorden 1 mile ENE of Groto, can accommodate tankers of from 50,000 to 500,000 dwt. It is 135m long and has a depth of 28m alongside. Tankers normally berth port side-to. Produkthamen, a product terminal jetty extends 380m ENE from the S shore of Trommekilen, 2 miles ENE of Groto, has a depth of 16m alongside its outer end where it can accommodate vessels from 7,000 dwt to 60,000 dwt and up to 230m in length at two outer berths. It has two inner berths, each with a depth of 8.8m alongside, one for vessels up to 3,000 dwt and the other for vessels up to 7,000 dwt. Fuel, oil and fresh water can be supplied.

Aspect.—The two highest chimneys of Scanraff Oil Refinery, each with an elevation of 165m and marked by red obstruction lights, and chimneys from which flares are burnt, are visible far out to sea. The pilot lookout station at Fiskebacksvik Light is easily identified.

Pilotage.—Pilots are ordered by VHF through Lysekil Pilot Station. Pilots board most vessels at Brofjorden Angoring Lighted Buoy. Pilots board VLCCs about 3 miles SW of the same buoy. Two pilots are required for vessels larger than 60,000 grt.

There is a port radio station at the oil harbor.

There are 2 tugs, one of which is always available. When vessels larger than 60,000 dwt lie at the crude oil berth, 2 tugs are made available. Larger vessels, VLCCs and ULCCs are assisted in the approach channel by tugs. Under normal conditions, 6 tugs are used to berth a VLCC. Additional tugs can also be ordered on VHF channel 16. All tankers carrying crude oil and tankers greater than 30,000 dwt carrying dirty petroleum products and bound for Brofjorden must be escorted by tugs in the channel, starting at the pilot boarding position.

GAVEN LIGHTHOUSE

VLCCs are requested to give 72 hours ETA notice and product tankers to give 48 hours.

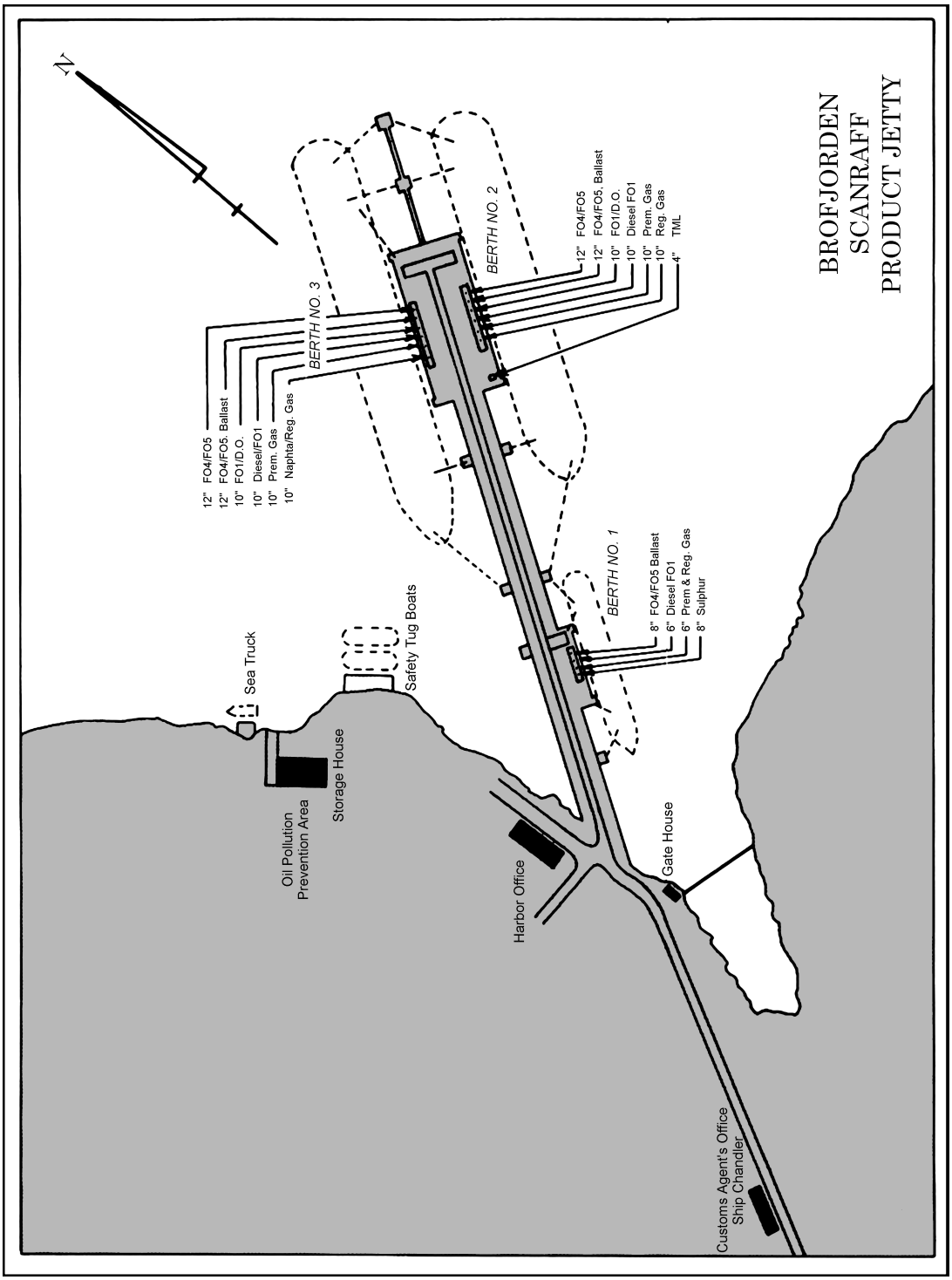
When berthing, VLCC's berth during daylight hours only. Th current at the outer buoys (1 and 2) must not be more than 1 knot. Visibility must be at a minimum of 4 miles. The wind force must not be more than 20 knots.

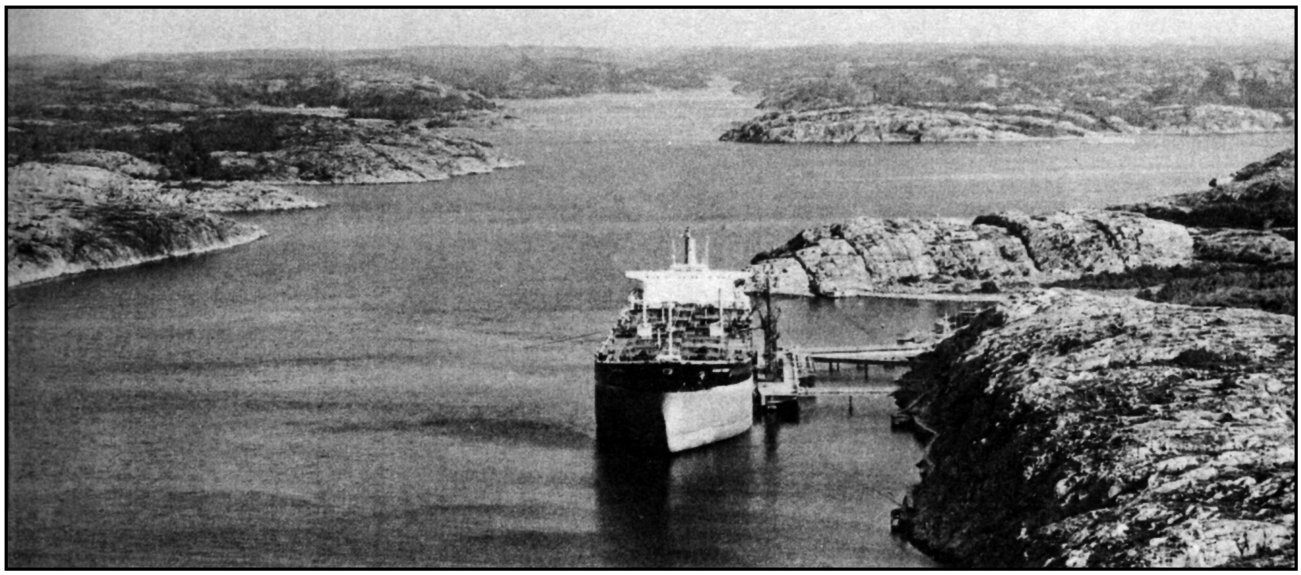
For VLCCs, tugs are made fast after passage of Dnyabrott and Brandskars Flak Lighthouses. For product tankers, tugs are made fast when passing Bukacka Buoy, opposite the crude oil berth.

Anchorage.—An anchorage for ULCCs and VLCCs has been established 4 miles SSW of Brofjorden Angoring Lighted Buoy, in depths of more than 50m. The anchorage has a radius of 0.8 mile.

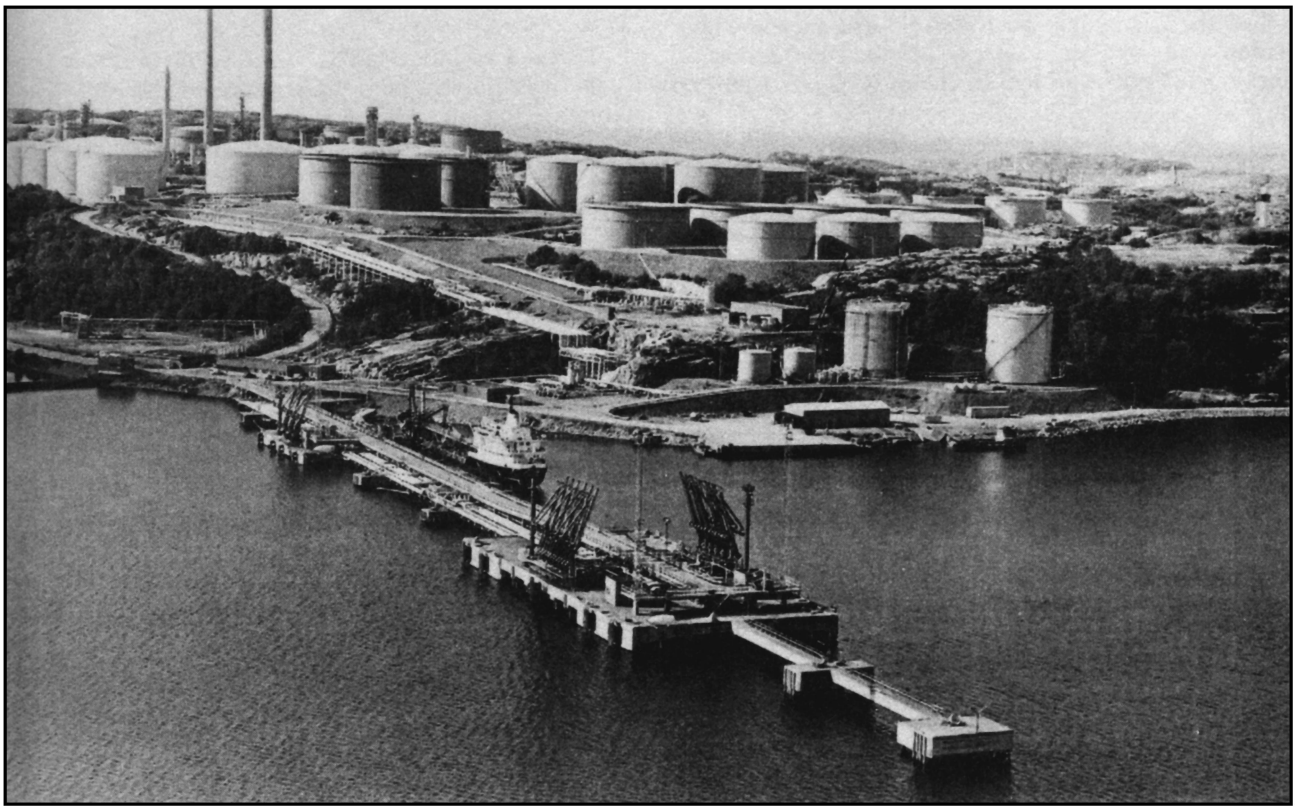
Large vessels with local knowledge can obtain good anchorage 0.25 mile NW of Tinnholmen in depths of up to 27m, but care is necessary to avoid a submarine cable which exists S of the anchorage. Such vessels can anchor within Brofjorden and smaller vessels, up to 10,000 dwt in Trommekilen 0.3 mile S of the SE end of Ryxo, in depths up to 20m, mud.

5.17 Gaven Lighthouse (58˚16'N., 11˚21'E.) is the main approach light for the Port of Lysekil. Situated on an islet, about 2 miles SW of Stora Kornoarna, vessels approaching from the SW or WSW should proceed in the white sectors of Gaven Light which will lead clear of the outer dangers, lying off the Swedish coast from this direction.


BROFJORDEN
SCANRAFF
PRODUCT JETTY
N
BERTH NO. 3
12" FO4/FO5
12" FO4/FO5. Ballast
10" FO1/D.O.
10" Diesel/FO1
10" Prem. Gas
10" Naphta/Reg. Gas
BERTH NO. 2
12" FO4/FO5
12" FO4/FO5. Ballast
10" FO1/D.O.
10" Diesel FO1
10" Prem. Gas
10" Reg. Gas
4" TML
BERTH NO. 1
8" FO4/FO5 Ballast
6" Diesel FO1
6" Prem & Reg. Gas
8" Sulphur
Sea Truck
Safety Tug Boats
Storage House
Oil Pollution Prevention Area
Harbor Office
Gate House
Customs Agent's Office
Ship Chandler



RAOLJEHAMNEN—CRUDE OIL HARBOR



PRODUKTHAMEN PRODUCT HARBOR

Bonden, an island situated about 4 miles SSW of Gavan Lighthouse, is high with gently sloping sides and easily identified by its dark color which contrasts noticeably with the land behind. This island is steep-to except on its S side and is surmounted by a red and white beacon on its highest part.

Temporary anchorage can be obtained during SW or W winds about 0.3 mile ENE of Bonden beacon in a depth of 13m, sand and mud.

Care is necessary when approaching the anchorage from SE of Bonden to avoid Bondensdrag, a 2.9m shoal lying 0.25 mile SSE of the island.

An 8m patch lies 0.2 mile NE of the anchorage. If approaching the anchorage from N of Bonden, note that depths of 11m or less extend 0.2 mile N from the island.

Tovasungar, a dangerous reef, awash, lies about 3 miles SW of Gaven Lighthouse and is marked close W by a buoy.

Tova, a small rock awash, lies amongst a group of shoals between Bonden and Tovasungar and is most easily identified from the SW.

Brofjorden lighted sea buoy with Racon is moored about 1.75 miles NW of Tovasungar and also forms a good approach to Lysekil.

A wreck, with a least depth of 11m, lies sunk about 0.2 mile NW of Tovasungar Buoy.

Berggylteskar, a low irregular islet situated about 0.7 mile E of Gaven, forms a good mark in the SW approach to Lysekil. The N extremity of this islet in line, bearing 069˚, with Vallbodalsros, a peaked 58m hill just N of Lysekil, is normally used in daylight by pilots to bring larger vessels into the channel.

Gulskaren Lighthouse, situated on an islet about 1 mile ENE of Gaven, when bearing 059˚, leads through the channel NW of Berggylteskar and divides the routes to Norra Hamnen and Sodra Hamnen, the two harbors of Lysekil.

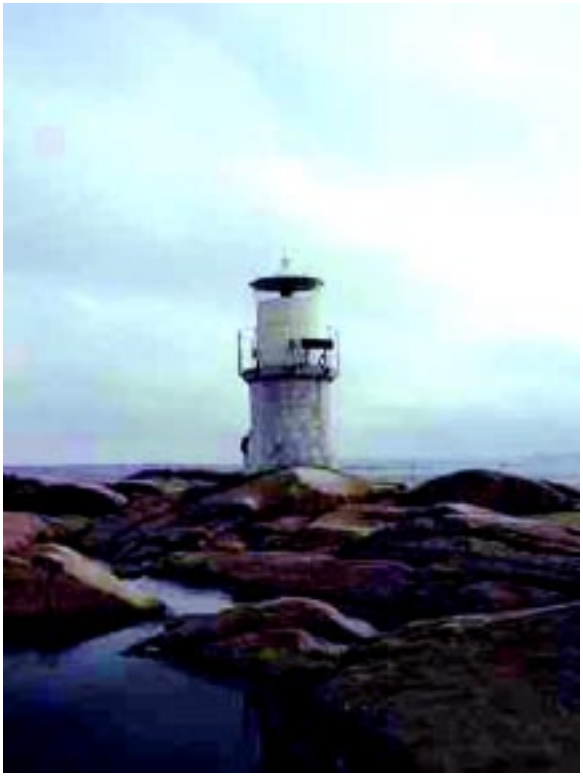
Vessels with drafts to 10m can proceed N of Berggylteskar and then round the lighted buoy, moored about 0.5 mile E, thus altering course to the SE and passing between Flatholmen and Stangholmen to Sodra Hamnen. Vessels with drafts to 8m can proceed N of Gulskaren and then to the anchorage in Norra Hamnen. Local knowledge is required.

Flatholmen Lighthouse, situated on the island about 2 miles ESE of Gaven, bearing about 095˚, leads from W of the latter and then N of Flatholmen to Sodra Hamnen. This approach can be used by vessels with drafts up to 8m; however, the course line passes close to numerous dangers and the channel should not be attempted except in good weather and with extensive local knowledge.

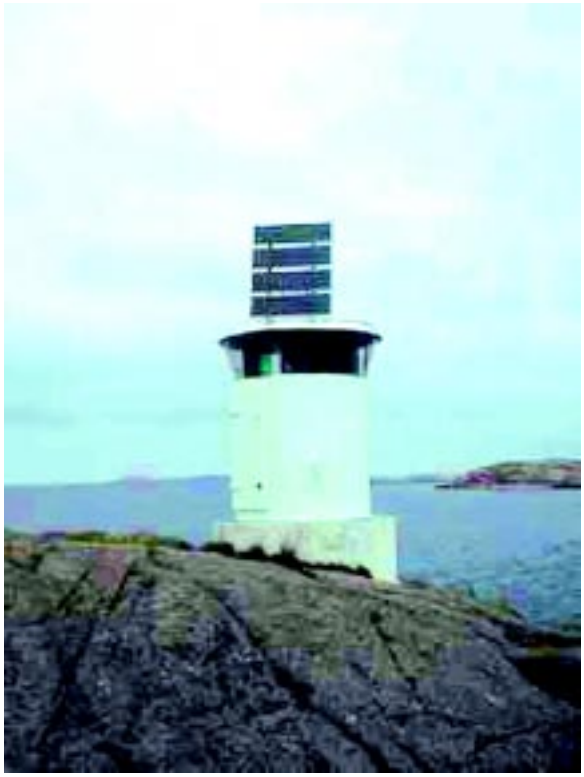
5.18 Lysekil (58˚16'N., 11˚26'E.) (World Port Index No. 23970) is situated on a promontory on the NW side of the entrance to Gullmarn and is about midway between the ports of Stromstad and Gotesborg. The two harbors of Lysekil, afford sheltered anchorage, and there is berthing space for ocean going vessels at several quays and piers.

Sodra Hamnen, the S harbor, contains the main facilities for the port including a dredged basin for ocean going vessels.

Norra Hamnen is entered within the island of Skeppholmen and will accommodate small vessels and fishing vessels.



GULSKAREN LIGHTHOUSE



FLATHOLMEN LIGHTHOUSE

Winds—Weather.—Winds predominate from the SW a good part of the year. Winds from the NE occur more frequently in winter but observations indicate a good deal of variance with prevalence not exceeding 40 percent from any one direction. Calms are common in winter.

Fog is frequent in winter, averaging 6 days a month in December but in summer it is rare.

Temperatures vary from average lows of 11˚C in winter, to average highs of 27˚C in summer. Ice in the approach channels usually does not hinder navigation at any time of the year.

Tides—Currents.—Tidal rises are generally less than 0.5m, however, water levels may be affected considerably by wind variations, rising on westerlies and falling on easterlies.

Current as a rule goes northward along the coast but changes with wind conditions and may become strong under long steady fresh winds.

Depths—Limitations.—There are general depths of 11 to 20m, clay bottom, to Sodra Hamnen.

The berth Anderssonskaj is used for passenger traffic; Gullmarskajen and Grotokajen are both used for general cargo; and Grotorevskaj is for container use.

Berth	Length	Depth
Anderssonskaj	140m	5.6m
Grotokajen	170m	6.7m
Grotorevskaj	70m	11.5m
Gullmarskajen	180m	9.6m

For the fishing fleet and local traffic, there is a fishing port with 100m of quay with a 4.9m depth alongside.

In addition, there is 400m of old quays with 2.7 to 4.6m alongside.

Aspect.—Lysekil Church, with a spire 89m high, is situated in the SE part of the town and is a good landmark from seaward.

Vallbodalsros, 7.75 miles ESE of Hallo Lighthouse and about 0.5 mile N of Lysekil, is a light-colored hill sloping gradually and with a cairn on its summit.

Backehogar, about 3 miles ESE of Lysekil Church, are three hummocks of nearly equal height, situated on the mainland and conspicuous from the W.

Pilotage.—Lysekil is a District Pilot Station and a radio watch is maintained 24 hours a day. Under normal conditions pilots will board vessels between the hours of 0500 and 2359 about 2 miles WSW of Gavan Island.

An ETA is required 5 hours in advance for local pilotage and 12 hours in advance for long distance pilotage or special circumstances, when pilots will board 24 hours a day.

Pilotage is compulsory between the Norwegian border and 58˚06'N, but excluding the fairway E of Orust to Uddevalla and E of longitude 11˚45'E in Havstenfjord, as follows:

1. All Category 1 vessels.
2. Category 2 vessels of 80m length, 15m beam, and 5m draft and over.
3. Category 3 vessels of 90m length, 16m beam, and 5.5m draft and over.

In certain pilot channels between Brofjordens Angoring and Brofjorden, pilotage is compulsory, as follows:

1. All Category 1 vessels.
2. Category 2 vessels of 90m length, 16m beam, and 5.5m draft and over.
3. Category 3 vessels of 100m length, 17m beam, and 6m draft and over.

Pilots from Lysekil will take vessels to ports between Nordkoster and Marstrand, and to Uddevalla by the northern channel, providing advance arrangements have been made.

The pilot station and pilot boats are equipped with VHF and radiotelephone.

Anchorage.—Vessels of moderate size with local knowledge can anchor 0.15 mile E of Stora Skeppholmen, an inlet off Norra Hamnen 0.4 mile SW of Vallbodalsholm, in depths up to 20m, mud, with good holding ground.

PORT OF LYSEKIL

Anchorage is prohibited between Groto and Tova, SE of Lysekil, to prevent fouling the facilities of the degaussing station. Anchorage is also prohibited in the vicinity of the submarine cable and pipeline S of the harbor.

Caution.—Vessels are warned not to anchor or fish within the following area due to the possible existence of bottom mines:

1. In the SW approach to Lysekil, within an area between the parallels of latitude 58˚10.5' N and 58˚13.5'N and between the meridians of longitude 11˚13.6'E and 11˚18.0'E.
2. In an area, bounded N by **Flatholmen** (58˚15'N., 11˚25'E.), S by Usholmen, SE by Graskamen, and NE by Spattan.

5.19 From Lysekil, Gullmarn Fjord trends NNE for about 9 miles to Stora Borno and Lilla Borno, where it divides into Farlevfjorden extending N and Saltkallefjorden extending NE.

The shores of Gullmarn Fjord are fringed by shoal water in places but few dangers lie in the fairway which has considerable depth over most of its length.

Vessels drawing up to 10m can proceed to the head of Saltkallefjorden where there is good anchorage in 13 to 20m, clay in either of the coves off the small port of Munkedalshamn.

Vessels drawing up to 8m can proceed to within 1 mile of the head of Farlevfjorden where there is anchorage for small vessels in depths of 10 to 12m, clay.

Saltkallefjord can be entered at night and there is a pier at Munkedalshamn about 123m long with depths of 6 to 11m alongside. Local knowledge is necessary for the fjords and pilots can be obtained at Lysekil. Mooring of larger vessels is only allowed in daylight; tugs are available.

Fishebackskil (58˚15'N., 11˚28'E.) (World Port Index No. 23980), a fishing village, is situated on the S side of the entrance to Gullmarn Fjord, in a narrow inlet available only to small vessels and fishing boats.

Mansholmen, a small island located off the W side of the harbor entrance, indicates the approach, but a rock with a depth of 1.6m and marked by a buoy, restricts the channel to the E. A speed limit of 4 knots is in force from the entrance E of Mansholmen to the S part of Fishebackskil.

Small vessels with local knowledge can take anchorage about 0.1 mile W of Mansholmen in depths of 8 to 17m, mud and clay. A 4m patch lies about 183m W of the anchorage.

There is a pier at the cannery in Fishebackskil with depths of 2.7 to 4.3m alongside.

5.20 Grundsund (58˚13'N., 11˚25'E.) (World Port Index No. 23985)**.—**Grundsund is a sheltered fishing and small craft harbor, protected by a breakwater, and it contains 40 berths for small craft in depths of 3.5 to 4m. The harbor is situated about 3 miles S of Lysekil and can be approached from the N or S by the channel leading from Lysekil to **Hattan** (58˚10.5'N., 11˚22'E.). Vessels with drafts up to 8m can use this channel which leads between Grundsund and **Groto** (58˚13'N., 11˚24'E.). However, only small vessels with drafts not exceeding 4.4m can enter the port.

Ocean-going vessels can take anchorage W of Grundsund in depths of 18 to 30m, clay, 0.1 to 0.2 mile E of Groto.

Small vessels with local knowledge can anchor about 0.1 mile NW of the breakwater head at Grundsund in depths of 9 to 11m.

A rock awash, 0.45 mile NE of Groto Light and close off the E shore, is marked by a buoy.

There is about 303m of quayage at Grundsund which is located in two basins within the breakwater. The outer basin has a depth of 4.9m and the inner basin a depth of 4m.

Hattan Lighthouse (58˚10.5'N., 11˚22'E.), situated at the junction of the two seaward approaches to Ellosefjorden, is shown on an islet about 1.5 miles SW of the entrance to this fjord. The NW approach is made from S and W of Bonden with Hattan Lighthouse ahead bearing 120˚.

The SW approach, known as Hatte Rannan, is made with Hattan Lighthouse ahead bearing approximately 038˚, being maintained until about 0.5 mile from the islet when course is altered N to pass about 183m to the NW.

Caution.—Hatte Rannan should not be used during W gales due to the heavy ground swell returning from the island of Harmano. During severe gales the NW approach is also not recommended.

Islandsberg Lighthouse (58˚12'N., 11˚24'E.) situated at the SW extremity of Skaftolandet, when bearing 033˚ leads from NE of Hattan and E of Grasholmar Islands to the entrance of Ellosefjorden. A dark hill rising steeply from the sea to a height of 52m lies about 0.1 mile E of the light.

Depths—Limitations.—Vessels with drafts to 8m can enter by either Hatte Rannan or the NW approach to Ellosefjorden and proceed to Uddevalla through the chain of connecting fjords and sounds. Numerous dangers border these routes and local knowledge is essential.

Pilotage.—Pilots for the NW approach to Ellosefjorden can be obtained at Lysekil.

North Channel to Uddevalla.—The least depth of the N channel to Uddevalla is 8.5m in the dredged fairways between Ellosefjorden and the narrows at the N end of Orust.

Vessels with drafts to 8m can be navigated with local knowledge through the fairways, but a bottom width of approximately 40m in the turns precludes maximum recommended length to 70m.

Vessels with drafts or lengths above these limits are advised to use only the S approach to Uddevalla, commencing from the vicinity of Marstrandsfjorden.

Ellosefjorden (58˚11'N., 11˚26'E.) is entered about 0.5 mile SSW of Islandsberg Lighthouse with Fredagsholmen Lighthouse ahead bearing 118˚. The fishing port of Gullholmen, with a depth of about 3m, lies S of the entrance and is available only to small vessels with local knowledge.

Anchorage.—Anchorage is available in the S part of Ellosefjorden about 0.3 mile SE of Lilla Kyrkeskar, in depths of 8.6 to 11m, clay.

Directions.—After passing between Fredagsholmen and Stora Risholmen, about 137m to the SW, vessels steer to bring Fredagsholmen Lighthouse, astern, bearing about 297˚.

When S of Lilla Kyrkeskar course is gradually altered to the alignment of Ornekullen Range Lights, bearing 059˚, to proceed across the E part of Ellosefjorden and into the dredged channels of Malo Strommar.

5.21 Malo Strommar (58˚12'N., 11˚30'E.), the dredged channel leading between Orust and the islands of Malo and Flato, connects Ellosefjorden with Koljofjorden to the NE.

Strong tidal currents run through the channels, especially in the N part known as Bjornsundskanalen, where they may attain up to 3.5 knots on stronger ebbs. The mean rate is about 2 knots.

Hallen Range Lights, in line 194˚, astern, lead through the middle of Malo Strommar and then following the channel more to the E come on to Tarneskar Range Lights in line 239.5˚, astern, which lead through Bjornsundskanalen to Koljofjorden. The beacons marking the edges of the above channels are floodlit at night and some of the buoys in the wider sections are also. Dangers are buoyed in accordance with IALA Maritime Buoyage System (Region A).

Signals.—Vessels approaching the ferrylane shall give one long blast when passing the warning signs. In poor visibility, the ferries will sound one long and two short blasts every minute while underway.

Vessels requiring the chain to be sunk to a depth of more than 4m must sound two long blasts.

Caution.—Numerous submarine cables and submerged pipelines cross Malo Strommar between Orust and Malon and anchorage is prohibited in this dredged channel.

A chain driven ferry crosses the channel just N of Hallen and warning signs are placed on the confines of the fairway.

Vessels over 300 grt or 4m draft should contact the ferry 15 minutes before passage on VHF channel 12. When the ferry is moored on the Malo side, the maximum depth above the cable is 5m or less.

Koljofjordelocated, entered by steering SE from Bjornsundskanalen, is a long narrow fjord situated in a NE to SW direction leading along the NW shore of Orust.

Ravsnasu Range Lights (58˚16'N., 11˚39'E.), the rear light standing on the island of Kalvon and the front light 0.5 mile SW, when in line 047˚ lead through Koljofjorden to Borgilefjorden.

Borgilefjorden, an irregular fjord with several islets in its middle, is transited on the alignment of Hjalton Range Lights bearing 261˚, astern. This line leads through a narrow channel marked by buoys between Barholmen and the islet of Goden about 183m N. There is less than 3m of water within the buoys and caution is necessary to avoid being set off the range line in this area.

Saten Light, situated on the shore NE of Barholmen, bearing 177˚, astern, leads E of Kalvon and into Kalvofjorden.

Notesund (58˚18'N., 11˚42'E.), the connecting narrows between Kalvofjorden and Havstensfjord is approached with Hogholmen Light ahead bearing 049˚.

Caution is necessary on this line as a rock with a depth of 8.5m lies in the area and less water may be found.

A bridge with a vertical clearance of 26.5m and a navigable width of 50m spans Notesund E of Hogholmen, and Mattholmen Light ahead bearing 091˚, leads through the navigational span to N of Oso. At night the bridge is floodlit, the pillars on each side being illuminated and the center of the navigational span marked by a fixed white light.

There is a speed limit of 5 knots in the fairway between positions 250m W and 200m E of the bridge, and also in the basin, enclosed by inlets, 0.15 mile S of Hogholren Light.

When N of Oso, Sandvikskullen Light on the N end of Orust should be steered for bearing approximately 117.5˚ until clear of the shoal water S of Mattholmen, when course is altered ENE for Havstensfjord.

Havstensfjord and the continuation to Uddevalla is contained under the S Channel to Uddevalla.

5.22 Maseskar to Pater Noster.—Maseskar Lighthouse (58˚06'N., 11˚20'E.), a prominent landmark, is situated on the summit of the small island of the same name.

The island stands near the S end of a chain of islands and dangers extending up to 6 miles from Hermano.

Svarten, marked by a red beacon, lies about 0.3 mile SSE of Maseskar and is surrounded by shoal water. Makrillebaden, with a charted depth of 10.1m, lies near the S end of the dangers extending from Maseskar and should be kept clear of particularly in rough weather.

The channel between Masekar and Svarten will accommodate vessels with a 6m draft. Unmarked dangers encumber the channel and navigating the passage should not be attempted in heavy weather.

Karingofjord (58˚04'N., 11˚24'E.), an open fjord encompassed by numerous islands and islets, is situated at the SW end of Orust and can be approached from the N by vessels drawing up to 4.5m and proceeding from Ellosefjorden, or from the SW by vessels drawing up to 10m and proceeding from seaward.

Sodra Farleden, the SW approach, is entered in the white sector of Kraksundsgap Sodra Light, on the N end of Brato, bearing about 047˚. Kraksundsgap Range Beacons, the front a white board and the rear a white tower, are situated 0.75 and 1.5 miles NE of the above light and when in range 043.5˚ lead through the outer part of Sodra Farleden and between Brato and Krakholmen into Kraksund.

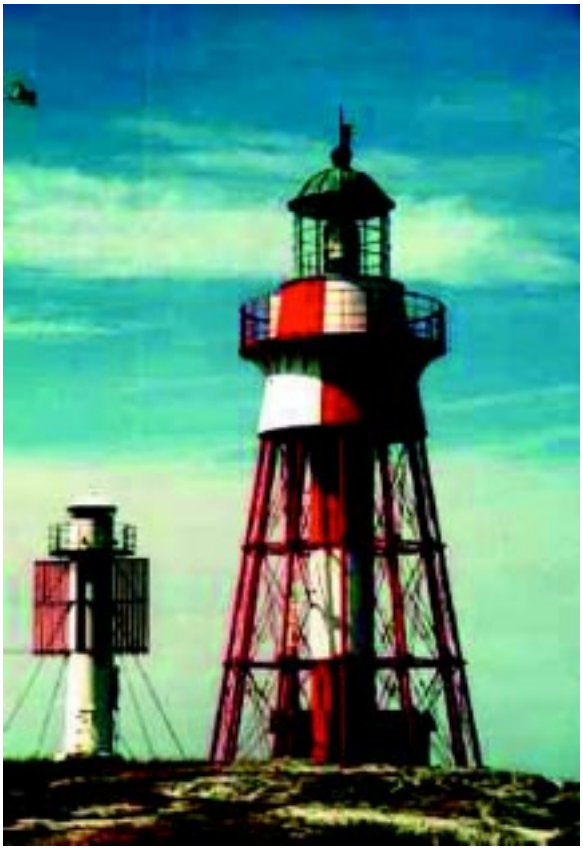
Anchorage can be taken in Kraksund, N of Brato and E of Krakholmen, by ocean-going vessels in depths of 13 to 15m, clay. During strong W winds, the sea sets through Kraksundsgap into the anchorage area and vessels may have to haul up NE of Krakholmen. A 1.2m patch, marked by a buoy, lies NE of the anchorage.

Karingon (58˚07'N., 11˚22'E.), a fishing port located on the N side of the island of the same name, is situated in the NW part of Karingofjord and is available only to small vessels with local knowledge. Approach is made from Sodra Farleden, altering course toward Orskar Light, 0.5 mile NNE of Karingon, when it comes to bear approximately 344˚.

Small craft occasionally approach from the E, with Karingo Kummel Light, on the E extremity of Karingon, in line 299˚ with the black beacon on Torno.

Anchorage can be taken by small vessels with local knowledge about 0.1 mile S of Orskar Light in depths of 13 to 18m, clay. The outer anchorage is accessible to vessels with a draft up to 7.3m.

PATER NOSTER LIGHTHOUSE



MASESKAR LIGHTHOUSE

Caution.—The LW level in Karingofjord is usually about 0.7m below mean sea level. The LLW is likely to occur in April when the fjord is subjected to strong easterly winds which may reduce depths as much as lm below mean sea level.

During strong winds, a considerable current to the E or NE may be encountered between Maseskar and Svarten and also in the channels NE of Orskar.

Stigfjorden (58˚04'N., 11˚35'E.), a narrow, encumbered fjord separating the islands of Orust and Tjorn, is entered from seaward by Krakfjord between Mollon and the island of Kauro about 1 mile to the S. Although vessels with drafts to 6m can enter from the W, the approaches and channels are difficult and require local knowledge. Skadda, a dangerous shoal, partly awash, lies in the middle of the entrance and limits the channel width to about 0.2 mile.

Small vessels with drafts to 3.5m and possessing local knowledge can proceed through Stigfjorden to Askerofjorden, in the southern channel to Uddevalla, by Skopesund, a narrow strait between Orust and Mjorn. A bridge with a vertical clearance of 21m crosses Skopesund in its W part and speed in the vicinity is restricted to 5 knots.

Anchorage can be taken by small vessels off Nosund, at the junction of Tangesund and Lyrosund, in depths of 6.4 to 11m, clay. Numerous submarine cables lie in the area and caution is advised.

5.23 Mollosund (58˚04'N., 11˚28'E.), a small fishing port of Mollosund located on the SW extremity of Orust, is sheltered by the island of Mollon. It can be approached from Tangesund on the E or from Karingofjord to the N. The basin on the W side of the town has a depth of 6m within and there is

about 366m of berthing space with depths of from 2 to 4.5m, alongside.

Pilotage.—Pilots for Mollosund can be secured from Lysekil and Marstrand. The speed limit in the channel and the harbor is 5 knots. The fishing harbor is protected by two breakwaters with an opening of 20m.

Hjarterofjord (57˚59'N., 11˚27'E.), situated off the SW coast of Tjorn, is heavily encumbered with shoals and islands. Gronskaren, the N group of islands, is separated from Haron by Rabbedjupet, a narrow channel connecting with Krakfjord to the N. Rockholmen Beacon standing on the island on the E side of Gronskaren, is conical and painted white with a black topmark. This beacon, in line 022˚ with Rabbehuvud Lighthouse, about 1 mile NNE, leads W of the dangers off the W side of Haron but the channel northward requires local knowledge.

Kyrkesund, the narrow channel on the E side of Haron, is marked by range lights and available to fishing boats drawing up to 4.4m but local knowledge is essential.

Anchorage, exposed to SW winds, can be obtained by moderate sized vessels with local knowledge in Krossefjorden, 0.7 mile NE of Svartskar, in a depth of 15m, mud.

A submarine cable crosses Krossefjorden close SW of the above anchorage.

Skarhamn (57˚59'N., 11˚33'E.), located in the SE comer of Hamnfjord, is approached from the S part of Hjarterofjord on the alignment of Skarhamn Range Lights bearing 050˚.

Vessels drawing up to 8m can approach from S of Bredbadan Light Buoy and pass about 137m SE of Inre Syster Beacon, a black cylinder which stands about 0.2 mile W of Sandholmen.

Use caution when passing the above beacon as a rock, awash, lies about 64m to the S and a 4.7m patch, marked by a buoy, lies SE of the channel in the same vicinity.

Anchorage, with good holding ground, can be found in depths of 10 to 13m, clay, in the NW half of Hamnfjord. The small harbor of Skarhamn, protected by a breakwater, lies in the SE part of Hamnfjord, and there is a quay 129m long with depths of 3.7 to 4.5m alongside.

Malaga Oil Harbor lies on the NW side of Hamnfjord and consists of a concrete quay in three parts. The main section is 135m long with a depth of 6.2m alongside.

Pilots for Skarhamn can be obtained at Marstrand.

Krossefjorden, an anchorage about 1 mile NW of Hamnfjorden, is available to ocean-going vessels with drafts to 8m and possessing local knowledge.

Approach is made on the alignment of Skarhamn Range Lights altering course to 018˚ when Sonet Olofs, a peaked hill with three beacons, comes in line with Dynanskar Beacon about 0.5 mile SSW.

The best anchorage is in Sunnaholmetang, in the NE part of Krossefjorden, where there are depths of 12 to 15m, clay.

5.24 Eggskar Light (57˚57'N., 11˚31'E.), located on the E extremity of the easternmost islet of the group, is approached from Hjarterofjord by passing S of Bredbaden Lighted Buoy and steering for the lighthouse bearing about 119˚.

Eggskar Beacon, painted black and white, is located W of the lighthouse and is occasionally used by small vessels in approaching the entrance which requires local knowledge by larger vessels. Drafts to 6m can be taken to anchorage off Kladesholmen when under the control of a pilot.

Vessels with the same draft can be taken through the inner route between Vaggen and Graen.

Kladesholmen, a fishing port located between the islands of Koholmen and Kladesholmen, is approached from the N by a channel dredged to a depth of 4.9m and contains several piers and a quay about 280m long. Depths in the harbor range from 3 to 4.5m and local knowledge is necessary for entering.

South approach to Kladesholmen.—Dynan (57˚41'N., 11˚48'E.), a small awash rock, is the outermost danger at the SW end of Pater Noster Skaren, the chain of low-lying islets, rocks and shoals extending 5 miles SW from the S end of Tjorn.

Hamneskar Light is shown from a framework mast, 8m in height and floodlit at night, on Hamneskar, about 1 mile E of Dynan.

The disused Pater Noster Lighthouse, a red metal tower on a framework base, 32m in height, also stands on the islet.

Anchorage can be taken by ocean-going vessels in Backerofjord, NE of Kladesholmen, where there are depths of 17 to 20m, clay.

Caution.—Caution is necessary to avoid the submarine cable crossing between Koholmen and the Tjorn.

Hatteberget Light (57˚52'N., 11˚28'E.) is shown from a tower built on an 11.8m patch, 2 miles S of Hamneskar. It divides the approach to Marstrandsfjorden into N and S branches. Hatteberget Light, equipped with racon is the principal navigational aid in the approach to the fjord.

A submarine cable is laid NNE from the light to the N side of Hamneskar.

Within the entrance, the N side of the fjord is bordered by Hamskar and the scattering of rocks and small islands of the Pater Noster Skaren. The SE side is bordered by the shoals W of Klaveron and a few of the other islands, including Marstrandson and **Koon** (57˚54'N., 11˚37'E.).

Aspect.—At a considerable distance from seaward, Vetteberget, 116m, high makes a good mark. It is situated in the S part of Tjorn. Tjorns Hufvud on the S extremity of the island, is lower but more conspicuous than Vetteberget because of its steep sides.

Blakullen, a hill rising to 130m, is located on Bratton about 4.5 miles E of Tjorns Hufvud and when seen from a distance has a bluish color.

The old Pater Lighthouse structure forms a good mark but the islands of Pater Noster Skaren are low and not easily seen until within about 3 miles. Marstrand Fortress on Marstrandson is an excellent landmark in clear weather and is visible from distances up to 20 miles. When first appearing the tower of this fortress resembles a square sail.

Pilotage.—Pilots are stationed at Marstrand where a constant watch is kept. They board vessels from a fast, orange colored, launch 1.25 miles WSW of Hatteberget Light or 1 mile W of Skallen Lighthouse.

Storebaden (57˚52'N., 11˚27'E.), with a depth of 8.5m, lies 1.5 miles SSW of Hamneskar. It is marked on its N side by a buoy. Storebaden Sodra Lighted buoy is moored at the S end of the shoal.

HATTEBERGET LIGHTHOUSE

Krakebaden, a 2.7m shoal marked by a buoy on its NW side, lies on the S side of the channel about 2 miles WSW of Klaveron and is the outer limit of a line of shoals extending southeastward.

Directions.—Vessels approaching from the W should steer in with Skallen Lighthouse on the W end of Marstrandson, ahead bearing 082˚. When Skottholmen Beacon, close NW of Sodra Astol, is in line with the old pilot lookout tower on Hattan bearing 065˚, alter course to this heading until the entrance between Norra and Sodra Astol can be made for on a heading of approximately 059˚.

Vessels approaching from the SW should steer in with Skallen Lighthouse in line with the old pilot lookout tower, on Hattan bearing 053˚, altering course for the entrance when about 2 miles from the lighthouse.

At night, enter Marstrandsfjorden in the white sector of Skallen Light, passing about 0.5 mile SE of Hotteberget Light.

When **Lonnbacken Light** (57˚51'N., 11˚33'E.) changes from red to green, alter course to enter the main channel of Marstrandsfjorden.

Pilotage.—Pilots board vessels entering Marstrandsfjorden from seaward, S of Pater Noster Lighthouse.

Strong W winds influence the water level in Marstrandsfjorden to rise and strong E winds cause it to fall.

The HHW levels are usually in autumn and the lowest in spring, when LW may be 0.8 to 0.9m below MSL.

5.25 Marstrand (57˚53'N., 11˚37'E.) (World Port Index No. 24010) is situated between the islands of Koon, Marstrandson, and Klaveron, the harbor of Marstrand is nearly landlocked and provides excellent anchorage for vessels with a draft up to 7m.

There are two entrances to Marstrand from Marstrandsfjorden; the N entrance leading between Koon and Marstrandson is available to vessels with drafts up to 4.7m; the other entrance, S of Marstrandson, lies between Tollskaren and Erholmen (Arholmen) and is available to vessels with drafts to 7m.

The entrance from the N remains ice free except for the most severe winters, but drift ice may have a tendency to enter S of Marstrandson. In any event, local knowledge is necessary for either of the two approaches.

At night, vessels can also enter between Marstrandson and Tollskaren by steering for Graberget Light, on the NW end of Klaveron bearing about 101˚. A 3m patch lies closeby.

Depths—Limitations.—The quay at Marstrand is about 149m long with depths of 3 to 4.7m alongside; several small piers are also available. The fishing harbor at Arvidsvik contains several piers with a depth of 4m, alongside.

Pilotage.—The pilot station at Marstrand provides pilotage to Uddevalla, Vinga Sand and Goteborg, Skarhamn, Lysekil, Kladesholmen, Stenungsund, Vallhamn, and Marstrand. Pilots board vessels within the archipelago W of Marstrand, or in the vicinity of Hatterberget Light (57˚52'N., 11˚28'E.).

Service is maintained 24 hours a day but requests for pilots should be made at least 5 hours in advance, stating ETA destination and draft. The pilot boats are steel sea-going launches and are fitted with echo sounders and VHF..

Pilotage is compulsory, as follows:

1. All Category 1 vessels.
2. Category 2 vessels of 80m length, 15m beam, and 5m draft and over.
3. Category 3 vessels of 90m length, 16m beam, and 5.5m draft and over.

In certain pilot channels between Marstrand and Vinga, pilotage is compulsory, as follows;

1. All Category 1 vessels.
2. Category 2 and 3 vessels of 70m length, 14m beam, and 4.5m draft and over.

Anchorage.—The best anchorage at Marstrand is in depths of 11 to 14m, clay, about 0.1 mile E of the SE extremity of Marstrandson. Anchorage is prohibited in the vicinity of the pipeline and submarine cables which crosses both entrances.

Caution.—Vessels are cautioned not to anchor, dredge, trawl, lay cables, bottom or conduct any similar type operation in the following areas, due to residual danger from mines on the bottom:

1. An area of 0.5 mile radius centered in (57˚53.9'N., 11˚13.8'E.), and in (57˚57'N., 11˚18'E.).

2. An area extending 4 miles W from Sor-Krakan, and S to the approximate position (57˚42.7'N., 11˚30'E.).

Ramholmen and Bussholmen are two islets lying between Sorkrakan and Klaveron. A beacon stands on the center of Bussholmen. A light shown from a white tower stands close N of the NE extremity of Russholmen. Lights in line, bearing 312.5˚, are also shown on the SW side of Ramholmen. Two small islets lie 1.5 miles SW of Ramholmen.

5.26 South Channel to Uddevalla.—The least depth in the S channel to Uddevalla is 11m located at Sunninge Sund, a dredged fairway 2 miles below the port. A bridge (Uddevallabron) has been completed which crosses Sunninge Sund and has a vertical clearance of 47 m. The spans cross from (58 ˚19.4'N., 11˚51'E.) to (58˚19.8'N., 11˚50.2'E.). Pilots will take vessels, with drafts up to 11m, to Uddevalla in good weather and during normal water levels. Vessels with drafts up to 13m can be taken to the pier at Stenungsund Power Station, about 15 miles below Uddevalla, but this is not in the normal trade.

Algofjorden (57˚55'N., 11˚35'E.), entered from Marstrandsfjorden between Norra Astol and Sodra Astol, leads ENE between Norra Meholmen and Sodra Meholmen Lighthouses and then between Hattan and Algon into Hakefjorden. A rock with a depth of 10.6m and marked by a buoy, lies close N of the fairway between Stenskar and Rison and caution is advised. A light is shown at Stenskar.

Anchorage.—There is good anchorage in Algofjorden in depths of 10 to 22m about 0.5 mile E of Sodra Astol.

Protection is afforded here from W winds and boats can proceed to Marstrand by the N entrance about 1 mile to the SW. Caution is necessary when approaching the anchorage, as depths of 5 to 6.4m, lie off the SE coast of Sodra Astol and extend up to 0.25 mile to the E.

Hakefjorden, entered between Hattan and Algon, leads NNE along the E side of Tjorn and is generally clear of dangers and easy to navigate. Mitholmarna, a group of islets and rocks marked by a light, lies near the middle of the fjord and should be kept to the E. A 10.1m patch, marked by a red buoy, lies about 1 mile NNE of the above light and should be avoided by deep draft vessels.

There is temporary anchorage in Hakefjorden, about 1 mile NE of the tower on Hattan, where there are depths from 12 to 15m. Although this anchorage affords good shelter, the holding ground has been reported to be poor.

5.27 Wallham (58˚01'N., 11˚42'E.) (World Port Index No. 24009), a small commercial port located on the E side of Tjorn, is approached from the vicinity Mitholmarna, passing between the islets of Svalte and Backvikskaren. Tangen, a promontory marked by a light, divides the inlet into two coves, the northern known as Svanviks Kil, containing the port and its ro-ro terminal.

A channel, whose E and W limits are marked by range lights, leads from Hakefjord to the harbor at Wallhamn.

This channel which is about 100m wide is reported to accommodate drafts up to 11m.

From abeam of Svalte to Wallhamn, the channel is marked by buoys.

Depths—Limitations.—In the harbor at Wallhamn N of Tangen, there are depths of 11m E of the dredged channel and from 8.5 to 10m W of the channel.

There are 5 berths which will accommodate vessels up to 250m. Berth No. 2 has a length of 180m with alongside depth of 10.8m, Berth No. 3 has a length of 130m with alongside depth of 10.8m, Berth No. 4 has a length of 160m with alongside depth of 8.5m, Berth No. 5 has a length of 239m with alongside depth of 8.5m; and Berth No. 6 has a length of 55m with alongside depth of 5.5m. There are ro-ro berths at Berth Nos. 2, 3, 4,and 5. Berth No. 6 is used for stone.

Pilotage.—Pilots boards at Hatteberget. Vessels can contact the pilot station on VHF channel 16. An ETA must be given 2 hours prior to arrival.

For passage through Malo Strommar from sea or Lysekil/ Brofjorden, pilotage is provided by Lysekil.

Directions.—Askerofjorden, entered by either of two passages situated W of the S end of Stenungson, is approached through a chain of islets to the S.

The main channel, between the islands of Kallon and Almon, is crossed by Tjorn Bridge having a vertical center clearance of 43m.

RO-RO DOCKS AT WALLHAM

The width of the overhead clearance is marked by red and green lights and by white square daymarks.

The channel in the vicinity of Tjorn is in the form of an "S" bend, obstructing visibility. Caution is necessary as vessels, some without pilots, may be met with little warning. On each side of the bridge, at a horizontal distance of 50m, synchronized occulting lights, red to port and green to starboard, are shown so as to be directionally beamed at full power approximately 0.5 mile from the span.

The E channel, narrow and more restricted in depth, is also bridged but with a vertical clearance of only 28m.

Traffic regulations and a 7 knot speed limit apply to vessels over 40m in length transiting the two fairways abreast Kallon.

When about 2 miles S or N of that position, a general call should be made on VHF channel 16, stating vessel's name, whether bound N or S, and estimated time of passing latitude 58˚03'N, or 58˚04'N, respectively. A long whistle blast should also be made at about 1.5 miles distance.

Stenungsund (58˚04'N., 11˚50'E.), a fishing port situated within the narrow channel E of the island of Stenungson, is available to small vessels with local knowledge. The S entrance is spanned by a bridge having a vertical clearance of 13m and depths in the approaches range from 4.9 to 6m. There is good anchorage N of the bridge and within the harbor in a depth of 6.4m, mud.

There are numerous small quays at the town with up to 3m alongside and several are equipped with cranes. Speed within the harbor is restricted to 5 knots or less. Larger vessels can only enter Stenungsund by day.

Pilotage is provided by Marstrand, unless needed for passage through Malo Strammar from sea or Lysekil/Brofjorden, which is then provided by Lysekil.

The Stenungsund Power Station (Plant) is the site of a deep water oil berth, located about 1 mile N of the town. The berth at this complex is 110m long, with a least depth of 12.6m on its N side. A depth of 10.6m exists on the S side of this berth.

Directions.—Two sets of range lights, in line at about 102˚, lead into these berths and warping buoys are moored off the seaward end of the pier to assist docking.

The Havden terminal berth is located about 0.5 mile SW of the power station. The berth has a length of 60m. Vessels up to 36,000 dwt can be accommodated.

Range lights are occasionally shown close E of this quay and in line bearing 102.5˚, indicate the approach.

Salt Quay, NW of the town, is 100m long, with a depth of 9.5m alongside, and has a berthing dolphin E of it. A quay farther S, at the town, is 40m long and has depths of 4m alongside. Pilots from Marstrand will take vessels with drafts up to 13m from Pater Noster to Stenungsund when conditions are ideal. Hydro Quay is located about 150m NW of Lerskiten.

Svanesund, entered at the NE end of Halsefjorden, is a narrow and fairly deep passage about 5 miles long which separates the E side of Orust from the mainland. Ocean-going vessels with drafts to 11.5m can use this channel, if under the control of a pilot, and proceed directly through to Havstensfjord at the junction of the N and S channels to Uddevalla.

Caution.—During fall and winter nights, the high shores of Svanesund cast confusing shadows which along with frequent fogs can make navigation exceedingly difficult. The same is also true of several of the other fjords, especially in the narrow passages formed between the shore and the higher islands.

Ljungskile (58˚13'N., 11˚56'E.), is a village at the N end of Svanesund. The town at the head of the cove has a small craft basin and is connected by road to Uddevella about 7 miles to the N. When approaching use caution as a 3.6m patch lies near the middle of the fairway, nearly 0.5 mile within the entrance.

A submarine cable is laid across the inlet close NE of the 3.6m shoal. An outfall lies 0.2 mile SW of the head of the inlet.

Bjorningarna, a group of islands halfway between Svanesund and Havstensfjord, are marked by a light in their W part. Naglarna, two shoals with depths of 1.4 to 2.2m, lie marked by a lighted buoy close E of the lighthouse and restrict the channel on this side to a width of about 183m.

To the W of Bjorningarna, a less confined channel, marked by buoys, is available to large vessels during daylight navigation.

5.28 Havstensfjord (58˚19'N., 11˚47'E.), formed by the junction of the N and S channels to Uddevalla, lies about 4 miles WSW of the port and is overall generally deep and clear of dangers. Vessels entering from the S can pass E or W of Korstensholmen, a long thin islet marked by a light on a rock at the S end. Stangen Light stands on the SE shore of Havstensfjord and marks the channel to Uddevalla.

Sunningesund, a narrow passage connecting Havstensfjord with Byfjorden, lies about 2 miles below Uddevalla and has a swept depth of 12.8m over a width of 195m. The edges of the swept channel are marked by lighted buoys.

Vessels approach the passage on an ENE heading and proceed through on the line of Uddevalla Range Lights bearing 059˚.

Vessels with a maximum draft of up to 11m can be taken through Sunningesund to Byfjorden under normal weather conditions. During strong E winds, water levels in the area may drop up to 0.7m and caution is advised. Large vessels must also avoid a 5.2m patch which lies close N of the range line about 0.7 mile NE of Sunningesund.

There is a bridge across Sunningesund which restricts air draft to 43 m.

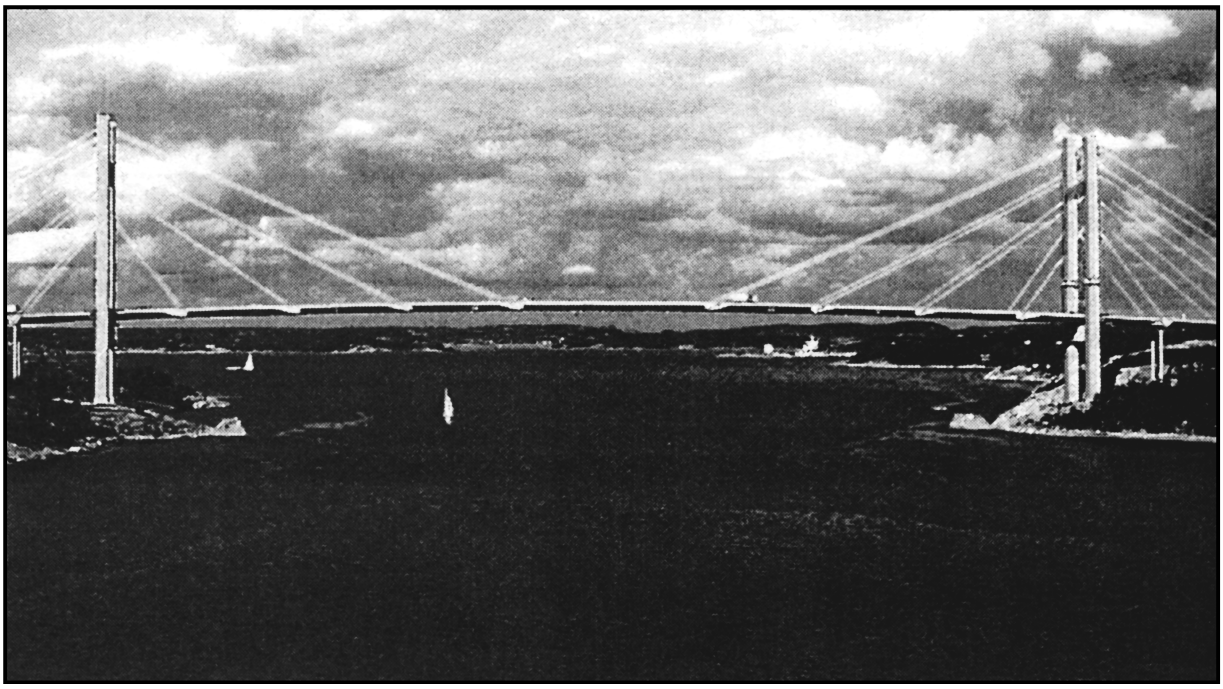
Traffic Regulations are in force in the approaches to Marstrand and Uddevalla.

Uddevalla (58˚21'N., 11˚55'E.) (World Port Index No. 23990), situated on the NE shore of Byfjorden and at the mouth of the Bavean River, is an industrial port which lies at the head of a chain of fjords nearly 40 miles from the sea.

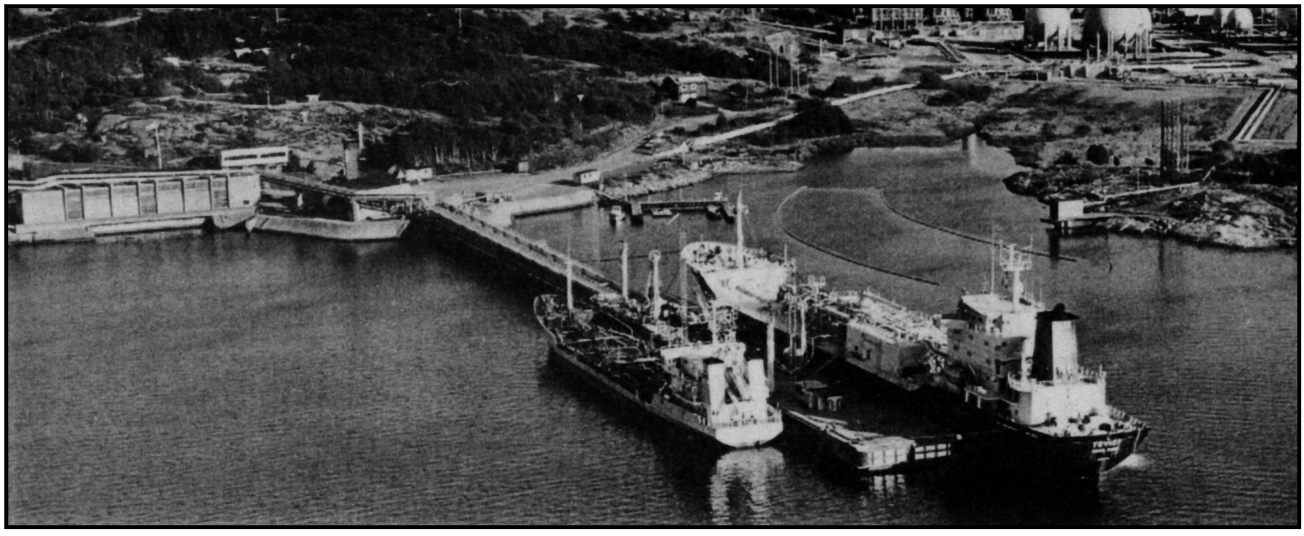
The harbor consists of several river berths and a deep water basin which contains the oil complex and commercial berths.

The port, in addition to these accommodations includes considerable facilities for shipbuilding and repairs.

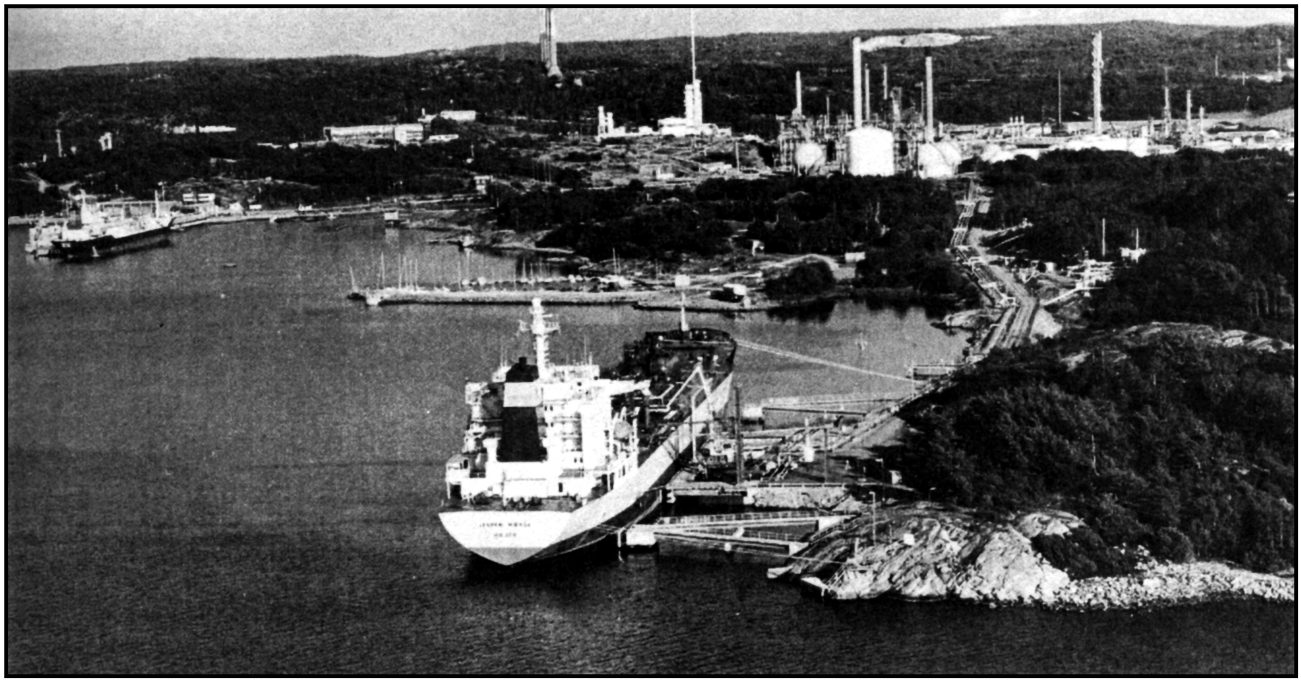
Winds—Weather.—Winds are predominately from the SW throughout the summer. Winds from the E are highest during



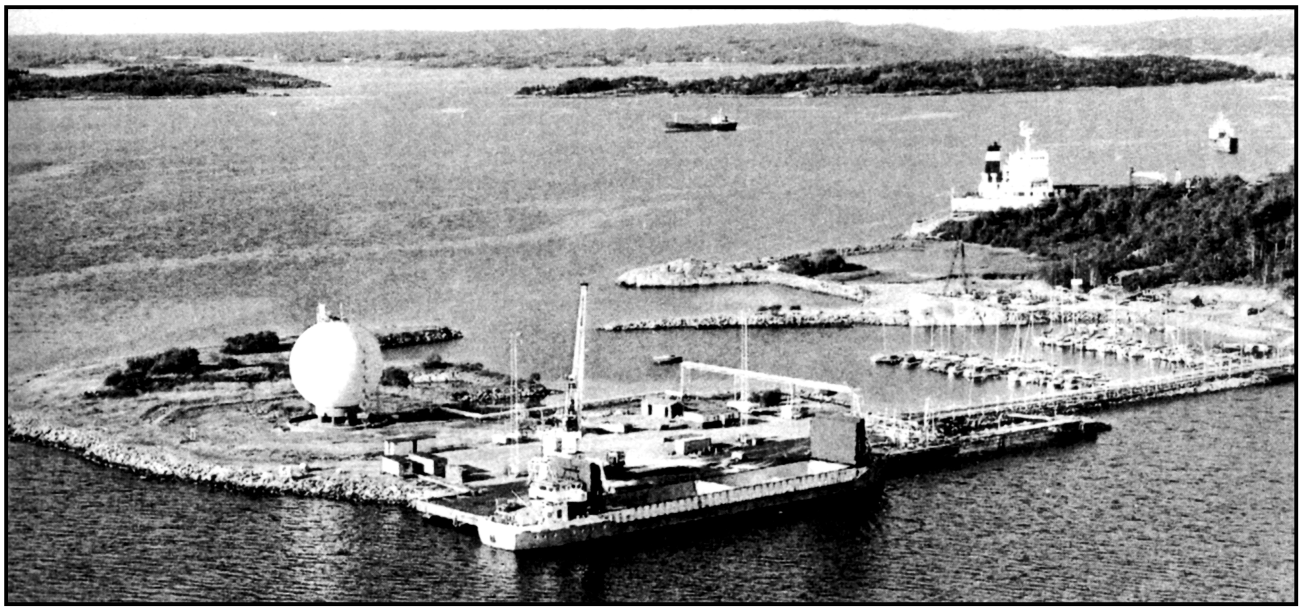
TJORN BRIDGE FROM S



POWER PLANT OIL PIER



OIL PIER FROM W



HYDRO QUAY FROM SW

PORT OF UDDEVALLA

January and from the NE in February. It should be noted however, that the percentage of winds from any one direction during the year rarely exceeds twenty-five.

Lowest temperatures are to be expected in January and February when mean lows range from 14˚ to 11˚C; lowest recorded temperature was about 9˚C. Highest temperatures occur in July, ranging from 27˚ to 32˚C.

Fogs are frequent in winter reaching an occurrence of 6 or 7 days a month in December. The least amount of fog generally occurs in June and July but patches of fog may be found in the fjords at any time.

Ice.—Ice seldom obstructs the harbor of Uddevalla and during bad winters, the port is kept open by ice-breaking tugs.

Tides—Currents.—The current always sets outward from Uddevalla and at times attains a considerable velocity in Sunningesund. In Svanesund, about 11 miles below Sunningesund, the velocity of the current is seldom more than 3 knots.

The water level in the approaches to Uddevalla ranges from 1.5m above mean sea level to 1.1m below it. Normally LW does not drop more than 0.7m below MSL but strong E winds may increase the fall.

Depths—Limitations.—Uddevalla Harbor can be approached by the N channel in a least depth of 8.5m or by the S channel with a least depth of 11m. The depths reported at the berths are at MW.

Berth	Length	Depth
Bado Quay W	430m	6-9.5m
Bave	180m	7m
Froland	225m	12m
Kasen	660m	5.9m
Skeppsholms Pier	340m	10.7-11m
Sorvik	250m	9-10.6m

Skeppsholm Quay is for bulk cargoes and has two 35-ton and several smaller cranes. There is also a ro-ro terminal here.

Tankers can be taken at Skeppsviken oil quay where there is a depth of 10.7m alongside.

There is a depth of 5.5m alongside at Brattasholmen oil quay, situated close NE of Skeppsholmen. There are three dolphins at each of the oil quays. Skans Quay is 180m long with a 6m depth alongside. Thule Quay is 105m long with a depth of 4m alongside. The quay at Juno is 200m long with an alongside depth of 6.0m.

Pilots will take vessels up to 70m in length and with a maximum draft to 8m to Uddevalla by the N channel.

Vessels up to 30,000 dwt with a maximum draft of 10.5m can be taken to a berth in the port by the S channel, when all conditions are ideal.

The large shipyard at Uddevalla can undertake repairs to vessels of the 250,000 dwt class. The floating drydock has a lifting capacity of 25,000 dwt.

Pilotage.—Pilotage is compulsory for dry cargo vessels of 1,600 dwt and over and for loaded tankers of 1,200 dwt and over.

Vessels embark pilots from Marstand pilot station, S of Uddevalla near Hatteberget Light (57˚52'N., 11˚28'E.). The pilots use VHF channel 14 for the working channel and VHF channel 16 for the listening channel.

If passage is needed through Malo Strammar from sea or Lysekil/Brofjorden, pilotage is provided by Lysekil.

A mandatory reporting and information system is in force in the approaches to Uddevalla, Kungshamn, Lysekil, and Marstrand.

Anchorage.—The best anchorages at Uddevalla are in Byfjorden where vessels can obtain shelter in nearly any cove.

Most vessels proceed into Gustavsbergsbukten, in the SE part of Byfjorden, where there is good anchorage in about 20 to 40m, clay bottom.

Be careful to avoid Lillon, an awash rock near the middle of the cove. Small vessels can secure good anchorage in

Kasebukten, the main harbor basin, where there are depths from about 7 to 11m, clay.

The N side of Kasebukten is quayed, with depths of 6m alongside; from the center of the quay a jetty projects 260m S, with depths of 7m on each side.

At Sorvik, on the W side of Kasebukten, there is a shipyard with quays dredged to a depth of 11m.

There are many other quays and jetties at Uddevalla Hamn most of which are served by the railway system.

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